# NASA/DoD Aerospace Knowledge Diffusion Research Project



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## *The Use of Selected Information Products and Services by U.S. Aerospace Engineers and Scientists: Results of Two Surveys*

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# The Use of Selected Information Products and Services By U.S. Aerospace Engineers and Scientists: Results of Two Surveys

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## ABSTRACT

The U.S. government technical report is a primary means by which the results of federally funded research and development (R&D) are transferred to the U.S. aerospace industry. However, little is known about this information product in terms of its actual use, importance, and value in the transfer of federally funded R&D. To help establish a body of knowledge, the U.S. government technical report is being investigated as part of the *NASA/DoD Aerospace Knowledge Diffusion Research Project.* In this report, we summarize the literature on technical reports and provide a model that depicts the transfer of federally funded aerospace R&D via the U.S. government technical report. We present results from two surveys of our investigation of aerospace knowledge diffusion vis-à-vis the U.S. government technical report and close with a brief overview of on-going research into aerospace knowledge diffusion emphasizing the role of the U.S. aerospace industry-affiliated information intermediary in the production, transfer, and use process.

## INTRODUCTION

NASA and the DoD maintain scientific and technical information (STI) systems for acquiring, processing, announcing, publishing, and transferring the results of government-performed and government-sponsored research. Within both the NASA and DoD STI systems, the U.S. government technical report is considered a primary mechanism for transferring the results of this research to the U.S. aerospace community. However, McClure (1988) concludes that we actually know little about the role, importance, and impact of the technical report in the transfer of federally funded R&D because little empirical information about this product is available.

To help fill this knowledge void, we are examining the U.S. government technical report as part of the *NASA/DoD Aerospace Knowledge Diffusion Research Project.* This project investigates, among other things, the information environment in which U.S. aerospace engineers and scientists work, the information-seeking behavior of U.S. aerospace engineers and scientists, and the factors that influence the use of STI (Pinelli, Kennedy, and Barclay, 1991; Pinelli, Kennedy, Barclay, and White, 1991). The results of this investigation could (1) advance the development of practical theory, (2) contribute to the design and development of aerospace information systems, and (3) have practical implications for transferring the results of federally funded aerospace R&D to the U.S. aerospace community. The project fact sheet is Appendix A.

In this report, we summarize the literature on technical reports and provide a model that depicts the transfer of federally funded aerospace R&D through the U.S. government technical report. We present results from two studies of our investigation of aerospace knowledge diffusion vis-à-vis the U.S. government technical report and close with a brief overview of on-going

research into aerospace knowledge diffusion emphasizing the role of the U.S. aerospace industry-affiliated information intermediary in the production, transfer, and use process.

## THE U.S. GOVERNMENT TECHNICAL REPORT

Although they have potential for increasing technological innovation, productivity, and economic competitiveness, U.S. government technical reports may not be utilized because of limitations in the existing transfer mechanism. According to Ballard, et al., (1986), the current system "guarantees that much of the Federal investment in creating STI will not be paid back in terms of tangible products and innovations." They further state that "a more active and coordinated role in STI transfer is needed at the Federal level if technical reports are to be better utilized."

### Characteristics of Technical Reports

The definition of the technical report varies because the report serves different roles in communication within and between organizations. The technical report has been defined etymologically, according to report content and method (U.S. Department of Defense, 1964); behaviorally, according to the influence on the reader (Ronco, et al., 1964); and rhetorically, according to the function of the report within a system for communicating STI (Mathes and Stevenson, 1976). The boundaries of technical report literature are difficult to establish because of wide variations in the content, purpose, and audience being addressed. The nature of the report -- whether it is informative, analytical, or assertive -- contributes to the difficulty.

Fry (1953) points out that technical reports are heterogenous, appearing in many shapes, sizes, layouts, and bindings. According to Smith (1981), "Their formats vary; they might be brief (two pages) or lengthy (500 pages). They appear as microfiche, computer printouts or vugraphs, and often they are loose leaf (with periodic changes that need to be inserted) or have a paper cover, and often contain foldouts. They slump on the shelf, their staples or prong fasteners snag other documents on the shelf, and they are not neat."

Technical reports may exhibit some or all of the following characteristics (Gibb and Phillips, 1979; Subramanyam, 1981):

- Publication is not through the publishing trade.
- Readership/audience is usually limited.
- Distribution may be limited or restricted.
- Content may include statistical data, catalogs, directions, design criteria, conference papers and proceedings, literature reviews, or bibliographies.
- Publication may involve a variety of printing and binding methods.

The SATCOM report (National Academy of Sciences - National Academy of Engineering, 1969) lists the following characteristics of the technical report:

- It is written for an individual or organization that has the right to require such reports.

- It is basically a stewardship report to some agency that has funded the research being reported.

- It permits prompt dissemination of data results on a typically flexible distribution basis.

- It can convey the total research story, including exhaustive exposition, detailed tables, ample illustrations, and full discussion of unsuccessful approaches.

**History and Growth of the U.S. Government Technical Report**

The development of the [U.S. government] technical report as a major means of communicating the results of R&D, according to Godfrey and Redman (1973), dates back to 1941 and the establishment of the U.S. Office of Scientific Research and Development (OSRD). Further, the growth of the U.S. government technical report coincides with the expanding role of the Federal government in science and technology during the post World War II era. However, U.S. government technical reports have existed for several decades. The Bureau of Mines *Reports of Investigation* (Redman, 1965/66), the *Professional Papers of the United States Geological Survey*, and the *Technological Papers of the National Bureau of Standards* (Auger, 1975) are early examples of U.S. government technical reports. Perhaps the first U.S. government publications officially created to document the results of federally funded (U.S.) R&D were the technical reports first published by the National Advisory Committee for Aeronautics (NACA) in 1917.

Auger (1975) states that "the history of technical report literature in the U.S. coincides almost entirely with the development of aeronautics, the aviation industry, and the creation of the NACA, which issued its first report in 1917." In her study, *Information Transfer in Engineering*, Shuchman (1981) reports that 75 percent of the engineers she surveyed used technical reports; that technical reports were important to engineers doing applied work; and that aerospace engineers, more than any other group of engineers, referred to technical reports. However, in many of these studies, including Shuchman's, it is often unclear whether U.S. government technical reports, non-U.S. government technical reports, or both are included.

The U.S. government technical report is a primary means by which the results of federally funded R&D are made available to the scientific community and are added to the literature of science and technology (President's Special Assistant for Science and Technology, 1962). McClure (1988) points out that "although the [U.S.] government technical report has been variously reviewed, compared, and contrasted, there is no real knowledge base regarding the role, production, use, and importance [of this information product] in terms of accomplishing this task." Our analysis of the literature supports the following conclusions reached by McClure:

- The body of available knowledge is simply inadequate and noncomparable to determine the role that the U.S. government technical report plays in transferring the results of federally funded R&D.

- Further, most of the available knowledge is largely anecdotal, limited in scope and dated, and unfocused in the sense that it lacks a conceptual framework.

- The available knowledge does not lend itself to developing "normalized" answers to questions regarding U.S. government technical reports.

## THE TRANSFER OF FEDERALLY FUNDED AEROSPACE R&D AND THE U.S. GOVERNMENT TECHNICAL REPORT

Three paradigms -- appropriability, dissemination, and diffusion -- have dominated the transfer of federally funded (U.S.) R&D (Ballard, et al., 1989; Williams and Gibson, 1990). Whereas variations of them have been tried within different agencies, overall Federal (U.S.) STI transfer activities continue to be driven by a "supply-side," dissemination model.

### The Dissemination Model

The **dissemination model** emphasizes the need to transfer information to potential users and embraces the belief that the production of quality knowledge is not sufficient to ensure its fullest use. Linkage mechanisms, such as information intermediaries, are needed to identify useful knowledge and to transfer it to potential users. This model assumes that if these mechanisms are available to link potential users with knowledge producers, then better opportunities exist for users to determine what knowledge is available, acquire it, and apply it to their needs. The strength of this model rests on the recognition that STI transfer and use are critical elements of the process of technological innovation. Its weakness lies in the fact that it is passive, for it does not take users into consideration except when they enter the system and request assistance. The **dissemination model** employs one-way, source-to-user transfer procedures that are seldom responsive in the user context. In fact, user requirements are seldom known or considered in the design of information products and services.

### The Transfer of (U.S.) Federally-Funded Aerospace R&D

A model depicting the transfer of federally funded aerospace R&D through the U.S. government technical report appears in figure 1. The model is composed of two parts -- the **informal** that relies on collegial contacts and the **formal** that relies on surrogates, information producers, and information intermediaries to complete the "producer to user" transfer process.

When U.S. government (i.e., NASA) technical reports are published, the initial or primary distribution is made to libraries and technical information centers. Copies are sent to surrogates for secondary and subsequent distribution. A limited number are set aside to be used by the author for the "scientist-to-scientist" exchange of information at the collegial level.

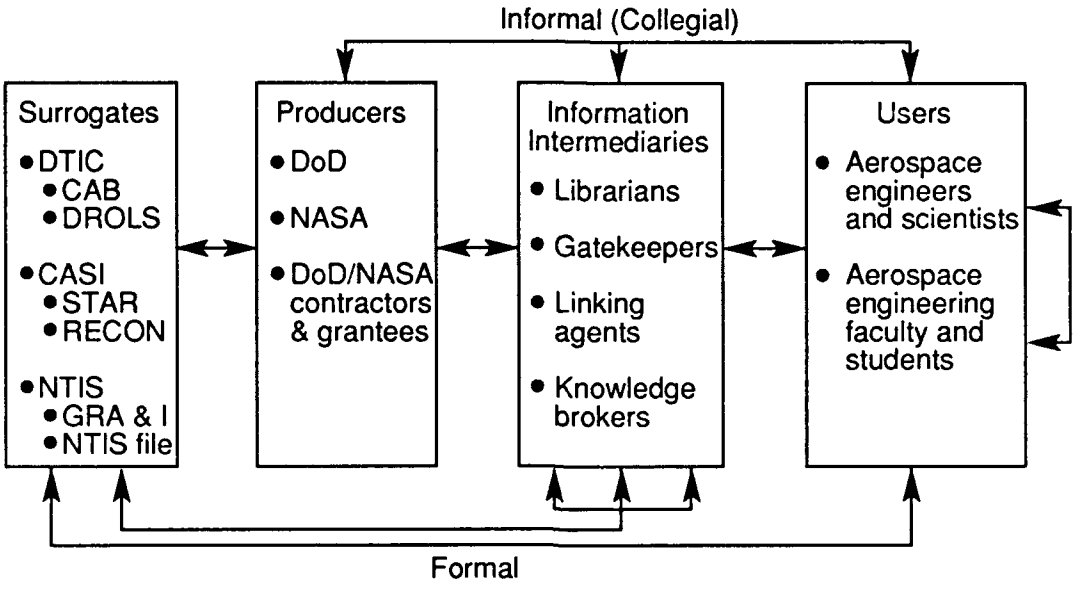


Figure 1. The U.S. Government Technical Report in a Model Depicting the Dissemination of Federally Funded Aerospace R&D.

Surrogates serve as technical report repositories or clearinghouses for the producers and include the Defense Technical Information Center (DTIC), the NASA Center for Aero Space Information (CASI), and the National Technical Information Service (NTIS). These surrogates have created a variety of technical report announcement journals such as *CAB* (Current Awareness Bibliographies), *STAR* (Scientific and Technical Aerospace Reports), and *GRA&I* (Government Reports Announcement and Index) and computerized retrieval systems such as DROLS (Defense RDT&E Online System), RECON (REsearch CONnection), and NTIS On-line that permit online access to technical report data bases. Information intermediaries are, in large part, librarians and technical information specialists in academia, government, and industry. Those representing the producers serve as what McGowan and Loveless (1981) describe as "knowledge brokers" or "linking agents." Information intermediaries connected with users act, according to Allen (1977), as "technological entrepreneurs" or "gatekeepers." The more "active" the intermediary, the more effective the transfer process becomes (Goldhor and Lund, 1983). Active intermediaries move information from the producer to the user, often utilizing interpersonal (i.e., face-to-face) communication in the process. Passive information intermediaries, on the other hand, "simply array information for the taking, relying on the initiative of the user to request or search out the information that may be needed" (Eveland, 1987).

The overall problem with the total Federal STI system is that "the present system for transferring the results of federally funded STI is passive, fragmented, and unfocused;" effective knowledge transfer is hindered by the fact that the Federal government "has no coherent of systematically designed approach to transferring the results of federally funded R&D to the user" (Ballard, et al., 1986). In their study of issues and options in Federal STI, Bikson and her colleagues (1984) found that many of the interviewees believed "dissemination activities were afterthoughts, undertaken without serious commitment by Federal agencies whose primary concerns were with [knowledge] production and not with knowledge transfer;" therefore, "much of what has been learned about [STI] and knowledge transfer has not been incorporated into federally supported information transfer activities."

Problematic to the **informal** part of the system is that knowledge users can learn from collegial contacts only what those contacts happen to know. Ample evidence supports the claim that no one researcher can know about or keep up with all the research in his/her area(s) of interest. Like other members of the scientific community, aerospace engineers and scientists are faced with the problem of too much information to know about, to keep up with, and to screen. To compound this problem, information itself is becoming more interdisciplinary in nature and more international in scope.

Two problems exist with the **formal** part of the system. First, the **formal** part of the system employs one-way, source-to-user transmission. The problem with this kind of transmission is that such formal one-way, "supply side" transfer procedures do not seem to be responsive to the user context (Bikson, et al., 1984). Rather, these efforts appear to start with an information system into which the users' requirements are retrofit (Adam, 1975). The consensus of the findings from the empirical research is that interactive, two-way communications are required for effective information transfer (Bikson, et al., 1984).

Second, the **formal** part relies heavily on information intermediaries to complete the knowledge transfer process. However, a strong methodological base for measuring or assessing the effectiveness of the information intermediary is lacking (Beyer and Trice, 1982). In addition, empirical data on the effectiveness of information intermediaries and the role(s) they play in knowledge transfer are sparse and inconclusive. The impact of information intermediaries is likely to be strongly conditional and limited to a specific institutional context.

According to Roberts and Frohman (1978), most Federal approaches to knowledge utilization have been ineffective in stimulating the diffusion of technological innovation. They claim that the numerous Federal STI programs are "highest in frequency and expense yet lowest in impact" and that Federal "information dissemination activities have led to little documented knowledge utilization." Roberts and Frohman also note that "governmental programs start to encourage utilization of knowledge only after the R&D results have been generated" rather than during the idea development phase of the innovation process. David (1986), Mowery (1983), and Mowery and Rosenberg (1979) conclude that successful [Federal] technological innovation rests more with the transfer and utilization of knowledge than with its production.

## U.S. AEROSPACE ENGINEERS AND SCIENTISTS AND THE USE OF SELECTED INFORMATION PRODUCTS AND SERVICES: AN ANALYSIS OF TWO SURVEYS

Since 1989, we have investigated the information-seeking behavior of U.S. aerospace engineers and scientists as a Phase 1 project activity. This investigation has placed particular emphasis on their use of federally funded aerospace R&D and U.S. government technical reports. The survey population included members of a professional (technical) society. Three self-administered (self-reported) mail surveys were used to gather data. (We refer to these instruments as the **green**, **yellow**, and **white** surveys.)

Results of the **green** survey (survey 1) have been published (Pinelli, 1990). The **yellow** survey focused the use, frequency of use, and importance of technical reports. The **white** survey focused on the use of announcement, current awareness, and bibliographic tools associated with technical reports. Results of the **yellow** and **white** surveys (surveys 2 and 3) are presented in this report. A brief overview of the methodology is provided for each survey. Data are presented for the **yellow** and **white** surveys, respectively.

Two self-administered (self-reported) questionnaires were used for data collection. The membership (approximately 34,000) who belonged to the American Institute of Aeronautics and Astronautics (AIAA) in January 1989 served as the study population. The sample frame for both surveys consisted of 6,781 AIAA members (1 out of 5) who reside in the U.S. Survey data were analyzed using the Statistical Package for the Social Sciences (SPSS). The survey 2 and 3 questionnaires are Appendixes B and C.

### Survey 2

Random sampling was used to select 1,735 members from the sample frame to participate in the **yellow** survey (survey 2). With an adjusted sample of 1,553 and 975 completed questionnaires, the adjusted response rate for survey 2 was 63 percent. Survey 2 was conducted from July 1989 through February 1990.

**Demographics.** The following composite participant profile was based on survey 2 demographic data which appear in table 1: works in industry (49.3%), works in management (35.1%) or in design/development (26.9%), has a graduate degree (72.5%), was educated (trained) as an engineer (83.6%), currently works as an engineer (66.7%), has an average of 21 years of professional work experience, and has had some part of this work funded by the U.S. government (84.3%).

Table 1. Survey Demographics
[N = 975]

| Demographics | Percentage | Number |
|---|---|---|
| Was your education primarily as: | | |
| An Engineer | 83.6 | 803 |
| A Scientist | 10.8 | 104 |
| Other | 5.6 | 54 |
| Are your present professional duties as: | | |
| An Engineer | 66.7 | 610 |
| A Scientist | 9.4 | 86 |
| Other | 23.9 | 219 |
| Your level of education is: | | |
| Bachelor's Degree or Less | 26.1 | 252 |
| Graduate Degree | 72.5 | 701 |
| Other | 1.3 | 13 |
| Do you currently work in: | | |
| Industry | 49.3 | 476 |
| Government | 21.8 | 210 |
| Academia | 17.9 | 173 |
| Other | 11.0 | 106 |
| Which best describes you? Are you in: | | |
| Academia/Teaching | 14.9 | 143 |
| Research | 14.6 | 140 |
| Design/Development | 26.9 | 259 |
| Manufacturing/Production | 0.8 | 8 |
| Management | 35.1 | 338 |
| Marketing/Sales/Service | 2.2 | 17 |
| Other | 5.5 | 53 |
| Years of professional work experience? | | |
| 1 to 10 years | 27.5 | 262 |
| 11 to 20 years | 19.3 | 184 |
| 21 to 30 years | 29.9 | 285 |
| 31 to 40+ years | 23.3 | 222 |
| Mean = 21 years Median = 22 years | | |
| Current work funded by the federal government? | | |
| Yes | 84.3 | 774 |
| No | 15.7 | 144 |

**Use.** Data about technical report use were collected from survey 2 participants. Within the context of other technical information products (i.e., conference-meeting papers, journal articles, and technical translations), respondents were asked to indicate their use of AGARD, DoD, and NASA technical reports (table 2). Conference-meeting papers and journal articles followed by NASA and DoD technical reports were used by the largest percentage of respondents. AGARD technical reports and technical translations were used by the smallest percentage of respondents.

Table 2. Use of Technical Information Product

| Information Products | Percentage | Number |
|---|---|---|
| Conference-Meeting Papers | 84.1 | 820 |
| Journal Articles | 85.2 | 831 |
| Technical Translations | 24.5 | 239 |
| AGARD Technical Reports | 32.2 | 314 |
| DoD Technical Reports | 58.7 | 572 |
| NASA Technical Reports | 73.5 | 717 |

**Importance.** Survey participants were asked to rate the importance of these same information products (table 3). Importance was measured on a 1 to 5 point scale with "1" being the lowest possible importance and "5" being the highest possible importance. Survey 2 respondents assigned the highest importance ratings to journal articles and conference-meeting papers followed by NASA and DoD technical reports. Although they were used less than AGARD technical reports, survey 2 respondents assigned a higher level of importance to technical translations than to AGARD technical reports.

Table 3. Importance of Technical Information Products

| Information Products | Average[a] (Mean) Importance Rating | Number |
|---|---|---|
| Conference-Meeting Papers | 3.65 | 956 |
| Journal Articles | 3.66 | 949 |
| Technical Translations | 2.84 | 841 |
| AGARD Technical Reports | 2.09 | 842 |
| DoD Technical Reports | 2.98 | 901 |
| NASA Technical Reports | 3.31 | 933 |

[a]A 1 to 5 point scale was used to measure importance, with "1" being the lowest possible importance and "5" being the highest possible importance. Hence, the higher the average (mean), the greater the importance of the product.

**Frequency of Use**. Survey participants were asked to indicate the average number of times they used technical translations, AGARD technical reports, DoD technical reports, and NASA technical reports in a 6-month period (table 4). Although a higher percentage of the survey participants used NASA technical reports (74%) than DoD technical reports (59%), the average (median) number of times they used DoD technical reports was slightly higher. Although the percentage of respondents using AGARD technical reports and technical translations was low, the frequency of use and the overall use rate for these information products were consistent.

Table 4. Frequency of Technical Information Product Use

| Information Products | Average Number of Times (Median) Used in a 6-Month Period | Number |
|---|---|---|
| Technical Translations | 4.5 (2.0) | 131 |
| AGARD Technical Reports | 4.2 (2.0) | 190 |
| DoD Technical Reports | 9.0 (4.0) | 424 |
| NASA Technical Reports | 8.5 (5.0) | 521 |

**Product Correlation**. The use of the four technical information products was correlated with their importance rating (table 5). Although the correlations were statistically significant, they were low for each of the four products. NASA and DoD technical reports had the highest "use to importance" correlation.

Table 5. Technical Information Product Use Correlated With Product Importance

| Information Products | Pearson's *r* | Number |
|---|---|---|
| Technical Translations | 0.191* | 128 |
| AGARD Technical Reports | 0.161* | 188 |
| DoD Technical Reports | 0.198* | 418 |
| NASA Technical Reports | 0.239* | 516 |

* $P \leq 0.05$

**Purpose of Use**. Survey participants were asked about the purposes for which they used technical translations, AGARD, DoD, and NASA technical reports (table 6). With one minor exception (AGARD technical reports), these products were used for research, followed by management and education.

Table 6. Use (Purpose) of Technical Information Product

| Information Products | Percentage* (Number) Used for the Following Purposes | | | |
|---|---|---|---|---|
| | Education | Research | Management | Other |
| Technical Translations | 40.2 (37) | 86.5 (142) | 45.0 (27) | 34.7 (15) |
| AGARD Technical Reports | 47.1 (56) | 85.5 (207) | 43.0 (28) | 45.3 (19) |
| DoD Technical Reports | 40.5 (101) | 83.9 (413) | 51.9 (131) | 50.9 (63) |
| NASA Technical Reports | 45.7 (169) | 84.9 (530) | 47.3 (107) | 51.1 (59) |

*Percentages do not total 100 percent because respondents could make multiple selections.

**Technical Translations**. Survey participants were asked two questions about technical translations: reasons for non-use and factors affecting the use of technical translations (tables 7 and 8).

**Reasons for Non-Use**. About 69% of the survey respondents who did not use them gave "not relevant to my research" as their reason for "non-use" followed by "availability/accessibility" (54.8%), the time it takes to physically obtain a translation (51.0%), and "not used in my discipline (45.1%). Reliability, in terms of either technical accuracy or language accuracy, was not a major factor in the non-use of technical translations.

Table 7. Reasons for Non-Use of Technical Translations

| Reasons | Percentage | Number |
|---|---|---|
| **Not Available/Accessible** | **54.8** | **278** |
| **Not Relevant to My Research** | **68.8** | **366** |
| **Not Used in My Discipline** | **45.1** | **205** |
| Not Reliable/Technically Inaccurate | 7.9 | **27** |
| Not Reliable/Language Inaccurate | 13.5 | 47 |
| **Takes Too Long to Get Them** | **51.0** | **214** |
| Not Timely/Current | 39.1 | 152 |

**Factors Affecting Use**. Survey participants who used technical translations were asked to indicate the extent to which their use of technical translations was affected by seven factors. (See table 8). Relevance, followed by accessibility, appear as the factors exerting the greatest influence on use. Technical quality, ease of use, and familiarity or experience round out the top five factors affecting the use of technical translations.

Table 8. Factors Affecting the Use of Technical Translations

| Factors | Overall Average[a] (Mean) Influence of Factor on Use | Number |
|---|---|---|
| **Accessibility** | **3.79** | **159** |
| Ease of Use | 3.36 | 156 |
| Expense | 2.33 | 153 |
| Familiarity or Experience | 3.27 | 155 |
| Technical Quality or Reliability | 3.47 | 155 |
| Comprehensiveness | 3.19 | 155 |
| **Relevance** | **3.83** | **155** |

[a]A 1 to 5 point scale was used to measure influence, with "1" being the lowest possible influence and "5" being the highest possible influence. Hence, the higher the average (mean), the greater the influence of the factor.

**AGARD Technical Reports.** Survey participants were asked their reasons for not using AGARD technical reports and the extent to which seven factors affected their use of these reports. They were also asked to indicate how often they find out about and obtain copies of AGARD technical reports. Survey participants were asked to rate AGARD technical reports according to seven characteristics.

**Reasons for Non-Use.** Seventy percent of the survey participants listed "not relevant to my research" as the reason for not using AGARD technical reports (table 9). About 51% of the respondents listed "not used in my discipline" and about 54% of the respondents listed "availability/accessibility" as reasons for not using AGARD technical reports. Reliability and timeliness did not appear to be factors in the non-use of AGARD technical reports.

Table 9. Reasons for Non-Use of AGARD Technical Reports

| Reasons | Percentage | Number |
|---|---|---|
| **Not Available/Accessible** | **53.7** | **212** |
| **Not Relevant to My Research** | **70.0** | **297** |
| **Not Used in My Discipline** | **51.1** | **181** |
| Not Reliable/Technically Inaccurate | 3.1 | 8 |
| Not Timely/Current | 16.2 | 44 |

**Factors Affecting Use**. Survey participants were also asked to indicate the extent to which seven factors affected their use of AGARD technical reports (table 10). Relevance, followed by comprehensiveness and technical quality or reliability, are the factors exerting the greatest influence on the use of AGARD technical reports.

Table 10. Factors Affecting the Use of AGARD Technical Reports

| Factors | Overall Average[a] (Mean) Influence of Factor on Use | Number |
|---|---|---|
| Accessibility | 3.54 | 221 |
| Ease of Use | 3.43 | 222 |
| Expense | 2.34 | 221 |
| Familiarity or Experience | 3.40 | 221 |
| **Technical Quality or Reliability** | **3.68** | **223** |
| **Comprehensiveness** | **3.73** | **222** |
| **Relevance** | **3.86** | **223** |

[a]A 1 to 5 point scale was used to measure influence, with "1" being the lowest possible influence and "5" being the highest possible influence. Hence, the higher the average (mean), the greater the influence of the factor.

**Awareness**. From a list of 12 and 7 sources, respectively, survey participants were also asked to indicate how often they find out about AGARD technical reports (table 11.) Survey participants indicated that they most frequently find out about AGARD technical reports through citations in other publications such as conference/meeting papers, journal articles, and technical reports (82.2%), followed by an intentional search of the library (69.9%) and a referral by a colleague (67.1%).

**Access**. About 80% of the respondents indicated that they obtain AGARD technical reports by ordering/requesting them through their library (table 11). About 56% of the respondents obtain AGARD technical reports from colleagues.

**Quality**. Survey participants were asked to rate AGARD technical reports on the following characteristics: quality of information, accuracy/precision of data, adequacy of data/documentation, organization/format, quality of graphics, timeliness/currency, and "advancing the state of the art" in their discipline (table 12). Survey participants rated quality of information highest ($\bar{X}$ = 4.11) followed by precision/accuracy of data ($\bar{X}$ = 3.99), and adequacy of data/ documentation ($\bar{X}$ = 3.83).

Table 11. How Users Become Aware of and Obtain AGARD Technical Reports

| Awareness Factors | Percentage | Number |
|---|---|---|
| Bibliographic Database Search | 45.8 | 120 |
| Announcement Journal (e.g. STAR) | 44.9 | 98 |
| Current Awareness Publication (e.g. SCAN) | 26.6 | 56 |
| **Cited in a Report/Journal/Conference Paper** | **82.8** | **183** |
| **Referred to Me by Colleague** | **67.1** | **149** |
| Referred to Me by Librarian/Technical Information Specialist | 31.6 | 68 |
| Routed to Me by Library | 20.3 | 44 |
| **By Intentional Search of Library Resources** | **69.9** | **151** |
| By Accident, by Browsing or Looking for Other Materials | 39.0 | 84 |
| AGARD Sends Them to Me | 16.6 | 36 |
| The Author Sends Them to Me | 16.8 | 36 |
| Other | 16.0 | 12 |
| **Physical Access Factors** | **Percentage** | **Number** |
| AGARD Sends Them to Me | 14.1 | 30 |
| The Author Sends Them to Me | 19.9 | 42 |
| I Request Them From the Author | 18.7 | 39 |
| **I Request/Order Them From My Library** | **79.7** | **177** |
| I Request/Order Them From NTIS | 35.7 | 75 |
| **I Get Them From a Colleague** | **56.4** | **123** |
| They Are Routed to Me By My Library | 18.9 | 40 |

Table 12. Average (Mean) Rating of AGARD Technical Reports

| Characteristics | Average (Mean)[a] Rating | Number |
|---|---|---|
| **Quality of Information** | **4.11** | **227** |
| **Precision/Accuracy of Data** | **3.99** | **227** |
| **Adequacy of Data/Documentation** | **3.83** | **225** |
| Organization/Format | 3.81 | 225 |
| Quality of Graphics (e.g., charts, photos, figures) | 3.62 | 228 |
| Timeliness/Currency | 3.60 | 225 |
| "Advancing the State of the Art" in Your Discipline | 3.57 | 223 |

[a]A 1 to 5 point scale was used to measure quality, with "1" being the lowest possible quality and "5" being the highest possible quality. Hence, the higher the average (mean), the greater the quality rating.

**DoD Technical Reports**. Survey participants were asked their reasons for not using DoD technical reports and the extent tc which seven factors affected their use of these reports. They were also asked to indicate how they find out about and obtain copies of DoD technical reports. Survey participants were asked to rate DoD technical reports according to seven characteristics.

**Reasons for Non-Use**. Survey participants were asked about their reasons for non-use and the factors affecting their use of DoD technical reports (table 13). Sixty-nine percent of the survey participants gave "not relevant to my research" as their reason for non-use followed by "not available/accessible" (49.6%) and "not used in my discipline" (37.1%).

Table 13. Reasons for Non-Use of DoD Technical Reports

| Reasons | Percentage | Number |
|---|---|---|
| **Not Available/Accessible** | **49.6** | **127** |
| **Not Relevant to My Research** | **69.0** | **194** |
| **Not Used in My Discipline** | **37.1** | **85** |
| Not Reliable/Technically Inaccurate | 5.5 | 10 |
| Not Timely/Current | 17.1 | 33 |

**Factors Affecting Use**. Survey participants were asked to indicate the extent to which their use of DoD technical reports was affected by several factors. Their responses are contained in table 14. Relevance and accessibility are the factors that exert the greatest influence on the use of DoD technical reports.

Table 14. Factors Affecting the Use of DoD Technical Reports

| Factors | Overall Average[a] (Mean) Influence of Factor on Use | Number |
|---|---|---|
| **Accessibility** | **3.89** | **492** |
| Ease of Use | 3.45 | 486 |
| Expense | 2.55 | 489 |
| Familiarity or Experience | 3.59 | 492 |
| Technical Quality or Reliability | 3.54 | 492 |
| Comprehensiveness | 3.43 | 492 |
| **Relevance** | **3.94** | **492** |

[a]A 1 to 5 point scale was used to measure influence, with "1" being the lowest possible influence and "5" being the highest possible influence. Hence, the higher the average (mean), the greater the influence of the factor.

**Awareness**. From a list of 12 and 7 sources, respectively, survey participants were also asked to indicate how often they find out about and actually obtain DoD technical reports. (See table 15.) Survey participants (77.8 %) indicated that they most frequently find out about DoD technical reports through citations in other publications such as conference/meeting papers, journals articles, and technical reports, from colleagues (69.4%) from intentionally searching library resources (63.1%), and from a bibliographic data base search (60.7%).

Table 15. How Users Become Aware of and Obtain DoD Technical Reports

| Awareness Factors | Percentage | Number |
|---|---|---|
| **Bibliographic Data Base Search** | **60.7** | **287** |
| Announcement Journal (e.g. STAR) | 42.5 | 199 |
| Current Awareness Publication (e.g. SCAN) | 27.1 | 124 |
| **Cited in a Report/Journal/Conference Paper** | **77.8** | **378** |
| **Referred to Me by Colleague** | **69.4** | **336** |
| Referred to Me by Librarian/Technical Information Specialist | 34.7 | 163 |
| Routed to Me by Library | 22.4 | 104 |
| **By Intentional Search of Library Resources** | **63.1** | **301** |
| By Accident, by Browsing or Looking for Other Materials | 39.0 | 183 |
| DoD Sends Them to Me | 36.0 | 171 |
| The Author Sends Them to Me | 28.2 | 132 |
| Other | 13.9 | 18 |
| **Physical Access Factors** | **Percentage** | **Number** |
| DoD Sends Them to Me | 39.3 | 190 |
| The Author Sends Them to Me | 29.2 | 140 |
| I Request Them From the Author | 32.4 | 154 |
| **I Request/Order Them From My Library** | **75.3** | **367** |
| I Request/Order Them From NTIS | 41.8 | 198 |
| **I Get Them From a Colleague** | **60.3** | **291** |
| They Are Routed to Me By My Library | 19.3 | 90 |

**Access**. About 75% on the respondents indicated that they obtain copies of DOD technical reports by requesting/ordering them from their library and about 60% indicated that they obtain them from colleagues (table 15). About 42% of the respondents indicated that they ordered copies of DoD reports from NTIS.

**Quality**. Survey participants were asked to rate DoD technical reports on the following characteristics: quality of information, accuracy/precision of data, adequacy of data/ documentation, organization/format, quality of graphics, timeliness/currency, and "advancing the state of the art" in their discipline (table 16). Survey participants rated quality of information highest ($\bar{X}$ = 3.89) followed by precision/accuracy of data ($\bar{X}$ = 3.81).

Table 16. Average (Mean) Rating of DoD Technical Reports

| Characteristics | Average (Mean)[a] Rating | Number |
|---|---|---|
| **Quality of Information** | **3.89** | **500** |
| **Precision/Accuracy of Data** | **3.81** | **501** |
| Adequacy of Data/Documentation | 3.58 | 499 |
| Organization/Format | 3.58 | 499 |
| Quality of Graphics (e.g., charts, photos, figures) | 3.41 | 500 |
| Timeliness/Currency | 3.56 | 498 |
| "Advancing the State of the Art" in Your Discipline | 3.52 | 493 |

[a]A 1 to 5 point scale was used to measure quality, with "1" being the lowest possible quality and "5" being the highest possible quality. Hence, the higher the average (mean), the greater the quality rating.

**NASA Technical Reports**. Survey participants were asked their reasons for not using NASA technical reports and the extent to which seven factors affected their use of these reports. They were also asked to indicate how they find out about and obtain copies of NASA technical reports. Survey participants were asked to rate NASA technical reports according to seven characteristics.

**Reasons for Non-Use**. Survey participants who dod not use them were asked their reasons for non-use of NASA technical reports. (See table 17.) About 73% of the respondents gave "not

Table 17. Reasons for Non-Use of NASA Technical Reports

| Reasons | Percentage | Number |
|---|---|---|
| Not Available/Accessible | 39.0 | 64 |
| **Not Relevant to My Research** | **72.9** | **159** |
| **Not Used in My Discipline** | **47.5** | **86** |
| Not Reliable/Technically Inaccurate | 2.3 | 3 |
| Not Timely/Current | 5.4 | 122 |

relevant to my research" as their principle reason for non-use followed by "not used in my discipline." Their reliability and technical accuracy and their timeliness and currency do not appear as reasons for non-use among survey respondents.

**Factors Affecting Use**. Survey participants were asked to indicate the extent to which their use of NASA technical reports was affected by several factors (table 18). Accessibility ($\bar{X}$ = 4.09), followed by relevance ($\bar{X}$ = 4.07), are the factors that exert the greatest influence on the use of NASA technical reports.

Table 18. Factors Affecting the Use of NASA Technical Reports

| Factors | Overall Average[a] (Mean) Influence of Factor on Use | Number |
|---|---|---|
| **Accessibility** | **4.09** | **621** |
| Ease of Use | 3.78 | 618 |
| Expense | 2.74 | 618 |
| Familiarity or Experience | 3.84 | 621 |
| Technical Quality or Reliability | 3.91 | 623 |
| Comprehensiveness | 3.74 | 619 |
| **Relevance** | **4.07** | **623** |

[a]A 1 to 5 point scale was used to measure influence, with "1" being the lowest possible influence and "5" being the highest possible influence. Hence, the higher the average (mean), the greater the influence of the factor.

**Awareness**. From a list of 12 and 7 sources, respectively, survey participants were also asked to indicate how they find out about and obtain NASA technical reports and how they rate the reports. (See tables 19 and 20.) Survey participants (83.8%) indicated that they most frequently find out about NASA technical reports through citations in other publications such as conference-meeting papers, journal articles, and technical reports. Seventy-five percent of the respondents find out about NASA technical reports from a colleague, 66% by intentionally searching library resources, and 57.7% from data base searches.

**Access**. About 75% of the survey respondents request/order NASA technical reports from their library and about 63% obtain them from colleagues. About 37% indicated that the author sent them or that they request them from the author.

**Quality**. Survey participants rated quality of information highest ($\bar{X}$ = 4.18) followed by precision/accuracy of data ($\bar{X}$ = 4.12) in NASA technical reports highest. The organization/ format ($\bar{X}$ = 3.92) and adequacy of data/documentation ($\bar{X}$ = 3.90) were also rated high.

Table 19. How Users Become Aware of and Obtain NASA Technical Reports

| Awareness Factors | Percentage | Number |
|---|---|---|
| **Bibliographic Data Base Search** | **57.7** | 335 |
| Announcement Journal (e.g. STAR) | 44.2 | 259 |
| Current Awareness Publication (e.g. SCAN) | 28.8 | 166 |
| **Cited in a Report/Journal/Conference Paper** | **83.8** | **506** |
| **Referred to Me by Colleague** | **75.0** | **452** |
| Referred to Me by Librarian/Technical Information Specialist | 30.7 | 178 |
| Routed to Me by Library | 17.6 | 101 |
| **By Intentional Search of Library Resources** | **66.0** | **387** |
| By Accident, by Browsing or Looking for Other Materials | 43.0 | 253 |
| NASA Sends Them to Me | 38.4 | 230 |
| The Author Sends Them to Me | 34.6 | 202 |
| Other | 15.7 | 22 |
| **Physical Access Factors** | **Percentage** | **Number** |
| NASA Sends Them to Me | 42.1 | 252 |
| The Author Sends Them to Me | 37.1 | 221 |
| I Request Them From the Author | 38.0 | 223 |
| **I Request/Order Them From My Library** | **74.7** | **452** |
| I Request/Order Them From NTIS | 36.5 | 214 |
| **I Get Them From a Colleague** | **63.4** | **379** |
| They Are Routed to Me By My Library | 17.9 | 102 |

Table 20. Average (Mean) Rating of NASA Technical Reports

| Characteristics | Average (Mean)[a] Rating | Number |
|---|---|---|
| **Quality of Information** | **4.18** | **625** |
| **Precision/Accuracy of Data** | **4.12** | **626** |
| Adequacy of Data/Documentation | 3.90 | 622 |
| Organization/Format | 3.92 | 624 |
| Quality of Graphics (e.g., charts, photos, figures) | 3.88 | 626 |
| Timeliness/Currency | 3.80 | 622 |
| "Advancing the State of the Art" in Your Discipline | 3.84 | 612 |

[a]A 1 to 5 point scale was used to measure quality, with "1" being the lowest possible quality and "5" being the highest possible quality. Hence, the higher the average (mean), the greater the quality rating.

**Use of NASA STI in Electronic Format**. Survey participants were asked if they would use selected NASA STI in electronic format (table 21). About 64% indicated a willingness to use computer program listings. Slightly more than half (56% and 57%) expressed a willingness to use data tables/mathematical presentations and an online system for NASA technical reports.

Table 21. Attitudes Toward the Use of NASA STI in Specified Formats

| Types of Information | Use of Information in Electronic Format | |
|---|---|---|
| | Likely % (n) | Unlikely % (n) |
| Data Tables/Mathematical Presentations | 57 (506) | 43 (384) |
| Computer Program Listings | 64 (532) | 36 (293) |
| Computerized, Online System for NASA Technical Reports | 56 (470) | 44 (369) |
| CD-ROM System for NASA Technical Reports | 40 (316) | 60 (473) |

Survey participants were also asked why they would not use the information in electronic format (table 22). With the exception of computer program lists, survey participants gave

Table 22. Reasons for "Unlikely to Use" NASA STI in Specified Formats

| Type of Information | No/ Limited Access % (n) | Hardware/ Software Incompatibility % (n) | Prefer Printed Format % (n) | Other % (n) |
|---|---|---|---|---|
| Data Tables/Mathematical Presentations | 13.3 (52) | 14.1 (55) | 41.7 (163) | 30.9 (121) |
| Computer Program Listings | 16.0 (49) | 19.3 (59) | 27.8 (85) | 36.9 (113) |
| Computerized, Online System for NASA Technical Reports | 17.5 (66) | 11.6 (44) | 50.5 (181) | 20.4 (77) |
| CD-ROM System for NASA Technical Reports | 23.3 (112) | 27.0 (130) | 32.2 (155) | 17.5 (84) |

"prefer printed format" as their reason for not using the information if it were available in electronic format. Hardware/software incompatibility was the next most frequent reason followed by no/limited (computer) access. It is important to note that about one third of the respondents selected some "other" reason for not using "data tables/mathematical presentations" and "computer program listings."

## Survey 3

Random sampling was used to select 1,705 members from the sample frame to participate in the **white** survey (survey 3). With an adjusted sample of 1,462 and 955 completed questionnaires, the adjusted response rate for survey 3 was 65 percent. Survey 3 was conducted from September 1989 through February 1990.

**Demographics.** The following composite participant profile was based on survey 3 demographic data which appear in table 23: works in industry (53.2%), works in management (34.9%) or in design/ development (29.3%), has a graduate degree (72.1%), was educated (trained) as an engineer (85.1%), currently works as an engineer (67.9%), has an average of 20 years of professional work experience, and has some part of their current work funded by the U.S. government (85.0%).

**Announcement, Current Awareness, Bibliographic Tools, and Data Bases.** As figure 1 shows (page 5), a variety of information products and services exists to provide awareness of and access to the results of federally funded aerospace R&D. In survey 3, these products and services were classified as print and electronic media. Survey respondents were asked a variety of questions concerning these products and services including use, familiarity with, frequency of use, reasons for non-use, and the factors affecting use. In addition, survey respondents were asked a series of questions regarding their use of, frequency of use, reasons for non-use, and problems encountered using federally funded aerospace R&D. Survey respondents were asked about their use of and reasons for non-use of foreign language (non-English) technical reports.

Use, Familiarity With, and Frequency of Use. Survey respondents were asked about their use of four print and three electronic products (table 24). The responses indicate that, overall, the respondents in survey 3 made little use of these products. NASA *STAR* was used most frequently but by only 25% of the respondents. Less than 10% used *NASA SP-7037*, DoD *CAB*, and NTIS *GRA&I*. In terms of frequency of use, NASA *STAR* was used "sometimes"; the other three print products were used "seldom." Those respondents who did not use the four print products were asked if they were familiar with them. With the exception of NASA *STAR* (25% indicated familiarity), most survey respondents were not familiar with the four print products.

Survey respondents were asked similar questions about three electronic products: NASA *RECON*, DoD *DROLS*, and the *NTIS File*. Survey respondents made little use of these products. The *NTIS File* was used by 17.3% and NASA *RECON* by 11.8%. Based on their responses, the respondents indicated little familiarity with the three electronic products.

Reasons for Non-Use. Survey participants were asked to indicate the reasons they did not use the four print and three electronic products (table 25). Reasons for the non-use of the print and electronic products varied slightly in the overall percentage response but all included "rely on others to search for needed information," followed by "not easily available/accessible" and "not relevant for what I do."

Table 23. Survey Demographics
[N = 955]

| Demographics | Percentage | Number |
|---|---|---|
| Was your education primarily as: | | |
| An Engineer | 85.1 | 808 |
| A Scientist | 11.9 | 113 |
| Other | 3.1 | 29 |
| Are your present professional duties as: | | |
| An Engineer | 67.9 | 624 |
| A Scientist | 8.8 | 81 |
| Other | 23.3 | 214 |
| Your level of education is: | | |
| Bachelor's Degree or Less | 26.5 | 253 |
| Graduate Degree | 72.1 | 686 |
| Other | 1.4 | 13 |
| Do you currently work in: | | |
| Industry | 53.2 | 505 |
| Government | 21.9 | 208 |
| Academia | 13.7 | 130 |
| Other | 11.1 | 106 |
| Which best describes you? Are you in: | | |
| Academia/Teaching | 10.9 | 104 |
| Research | 14.5 | 138 |
| Design/Development | 29.3 | 279 |
| Manufacturing/Production | 0.9 | 9 |
| Management | 34.9 | 331 |
| Marketing/Sales/Service | 2.5 | 24 |
| Other | 6.9 | 66 |
| Years of professional work experience? | | |
| 1 to 10 years | 28.1 | 265 |
| 11 to 20 years | 22.6 | 212 |
| 21 to 30 years | 29.1 | 274 |
| 31 to 40+ years | 20.1 | 189 |
| Mean = 20 years Median = 20 years | | |
| Current work funded by the federal government? | | |
| Yes | 85.0 | 796 |
| No | 15.0 | 141 |

Table 24. Use, Frequency of Use, and Familiarity With Selected Announcement, Current Awareness, and Bibliographic Tools

| Source | No % (n) | Yes % (n) | | | If No, Familiar With % (n) | |
|---|---|---|---|---|---|---|
| | | Frequently | Sometimes | Seldom | No | Yes |
| **Print Products:** | | | | | | |
| *STAR* | 77.5 (726) | 3.8 (36) | 12.0 (112) | 6.7 (63) | 74.1 (521) | 25.9 (182) |
| *NASA SP-7037* | 93.6 (881) | 0.8 (8) | 3.5 (33) | 2.1 (20) | 90.2 (779) | 9.8 (85) |
| *CAB* | 98.3 (928) | 0.3 (6) | 0.6 (6) | 0.8 (8) | 96.2 (867) | 3.8 (34) |
| *GRA&I* | 96.3 (910) | 0.6 (6) | 1.5 (14) | 1.6 (15) | 96.6 (855) | 3.4 (30) |
| **Electronic Products:** | | | | | | |
| *RECON* | 88.2 (830) | 2.3 (22) | 5.0 (47) | 4.5 (42) | 93.8 (760) | 6.2 (50) |
| *DROLS* | 96.7 (910) | 0.4 (4) | 1.9 (18) | 1.0 (9) | 98.1 (874) | 1.9 (17) |
| *NTIS File* | 82.7 (778) | 3.1 (29) | 8.7 (82) | 5.5 (52) | 86.1 (655) | 13.9 (106) |

Table 25. Reasons for Nonuse of Selected Announcement, Current Awareness, and Bibliographic Tools

(a) Print Products

| Reason Not Used | *STAR* % (n) | *NASA SP-7037* % (n) | *CAB* % (n) | *GRA&I* % (n) |
|---|---|---|---|---|
| **Not Easily Available/ Accessible** | **36.1 (74)** | **31.4 (32)** | **24.6 (15)** | **23.6 (13)** |
| **Not Relevant** | **26.8 (55)** | **21.6 (22)** | **16.4 (10)** | **16.4 (9)** |
| Don't Use Technical Reports | 5.9 (12) | 3.9 (4) | 4.9 (3) | 9.1 (5) |
| Get Same Information More Easily From Another Source | 17.6 (36) | 15.7 (16) | 13.1 (8) | 12.7 (7) |
| **Rely on Others to Search for Needed Information** | **38.5 (79)** | **37.3 (38)** | **24.6 (15)** | **21.8 (12)** |
| Difficult to Physically Obtain What's In There | 5.4 (11) | 3.9 (4) | 3.3 (2) | 3.6 (2) |
| Other | 7.8 (16) | 6.9 (7) | 4.9 (3) | 5.5 (3) |

Table 25. Reasons for Nonuse of Selected Announcement, Current Awareness, and Bibliographic Tools

(b) Electronic Products

| Reason Not Used | *RECON* % (n) | *DROLS* % (n) | *NTIS File* % (n) |
|---|---|---|---|
| **Not Easily Available/Accessible** | **30.0 (21)** | **21.6 (8)** | **30.9 (38)** |
| **Not Relevant** | **22.9 (16)** | **10.8 (4)** | **38.2 (47)** |
| Skill In Using Computer Hardware/ Software | 5.7 (4) | 5.4 (2) | 2.4 (3) |
| Skill In Using a Data Base | 8.6 (6) | 2.7 (1) | 4.9 (6) |
| Not Timely Or Current | 0.0 (0) | 2.7 (1) | 3.3 (4) |
| Get Same Information More Easily From Another Source | 21.4 (15) | 10.8 (4) | 21.1 (26) |
| Difficult to Physically Obtain What's In There | 1.4 (1) | 2.7 (1) | 3.3 (4) |
| System Is Not User Friendly | 0.0 (0) | 2.7 (1) | 0.0 (0) |
| Other | 15.7 (11) | 10.8 (4) | 12.2 (15) |

**Purpose of Use**. Those who used the four print and three electronic products were asked to indicate the purpose(s) for which they used them (table 26). Overall, respondents used both the print and electronic products for research, followed by education and management.

Table 26. Use (Purpose) of Selected Announcement, Current Awareness, and Bibliographic Tools

| Source | Percentage[a] (Number) Used for the Following Purposes in Past 6 Months | | | |
|---|---|---|---|---|
| | Education | Research | Management | Other |
| **Print Products:** | | | | |
| *STAR* | 38.8 (125) | 72.1 (196) | 24.0 (66) | 41.3 (37) |
| *NASA SP-7037* | 41.9 (34) | 79.8 (51) | 37.8 (22) | 27.1 (10) |
| *CAB* | 22.1 (7) | 64.7 (17) | 36.5 (13) | 17.5 (4) |
| *GRA&I* | 41.3 (12) | 77.1 (28) | 39.5 (11) | 27.5 (4) |
| **Electronic Products:** | | | | |
| *RECON* | 32.2 (40) | 81.8 (96) | 27.3 (32) | 11.2 (17) |
| *DROLS* | 30.0 (8) | 79.8 (28) | 30.0 (12) | 21.7 (3) |
| *NTIS File* | 33.3 (65) | 79.9 (134) | 31.0 (48) | 22.1 (26) |

[a]Percentages do not total 100 percent because respondents could make multiple selections.

**Factors Affecting Use**. Survey participants who used the four print and three electronic products were asked to indicate the extent to which their use of these products was affected by seven factors. (See table 27). Accessibility, ease of use, and familiarity or experience were the factors affecting the use of NASA *STAR*. Accessibility, ease of use, technical quality or reliability, and comprehensiveness influenced the use of *NASA SP-7037*. Relevance, technical quality or reliability, accessibility, and ease of use influence the use of DoD *CAB*. Technical quality or reliability, comprehensiveness, and relevance influence the use of NTIS *GRA&I*.

Table 27. Factors Affecting Use of Selected Announcement, Current Awareness, and Bibliographic Tools

(a) Print Products

| Factors | Overall Mean[a] Influence of Factor (Number of Responses) on Use of -- | | | |
|---|---|---|---|---|
| | *STAR* | *NASA SP-7037* | *CAB* | *GRA&I* |
| | $\bar{X}$ (n) | $\bar{X}$ (n) | $\bar{X}$ (n) | $\bar{X}$ (n) |
| Accessibility | 3.8 (213) | 3.8 (60) | 3.3 (17) | 3.5 (33) |
| Ease of Use | 3.6 (212) | 3.7 (58) | 3.3 (17) | 3.4 (33) |
| Expense | 2.7 (209) | 3.0 (57) | 2.6 (17) | 2.9 (32) |
| Familiarity or Experience | 3.6 (211) | 3.3.(58) | 3.2 (17) | 3.3 (33) |
| Technical Quality or Reliability | 3.5 (211) | 3.6 (59) | 3.6 (18) | 3.7 (31) |
| Comprehensiveness | 3.5 (210) | 3.6 (59) | 3.4 (17) | 3.7 (32) |
| Relevance | 3.5 (211) | 3.4 (59) | 3.6 (17) | 3.6 (32) |

[a]A 1 to 5 point scale was used to measure influence, with "1" being the lowest possible influence and "5" being the highest possible influence. Hence, the higher the average (mean), the greater the influence of the factor.

Accessibility, comprehensiveness, and relevance influence the use of NASA *RECON* (table 27b). Expense, accessibility, comprehensiveness, and relevance influence the use of DoD *DROLS*. Accessibility, comprehensiveness, and technical quality or reliability, and relevance influence the use of the *NTIS File*.

Table 27. Factors Affecting Use of Selected Announcement, Current Awareness, and Bibliographic Tools

(b) Electronic Products

| Factors | Overall Mean[a] Influence of Factor (Number of Responses) on Use of -- | | |
|---|---|---|---|
| | *RECON* | *DROLS* | *NTIS File* |
| | $\bar{X}$ (n) | $\bar{X}$ (n) | $\bar{X}$ (n) |
| Accessibility | 4.1 (103) | 3.8 (30) | 3.8 (153) |
| Ease of Use | 3.5 (100) | 3.5 (29) | 3.4 (149) |
| Expense | 2.7 (99) | 3.9 (28) | 2.6 (144) |
| Familiarity or Experience | 3.3 (101) | 3.2 (29) | 3.3 (148) |
| Technical Quality or Reliability | 3.6 (102) | 3.5 (29) | 3.5 (150) |
| Comprehensiveness | 3.7 (104) | 3.6 (29) | 3.6 (149) |
| Relevance | 3.7 (103) | 3.6 (29) | 3.5 (148) |

[a]A 1 to 5 point scale was used to measure influence, with "1" being the lowest possible influence and "5" being the highest possible influence. Hence, the higher the average (mean), the greater the influence of the factor.

**How Searched**. Those respondents who used them were asked to indicate how the three electronic products were searched (table 28). Most respondents indicated that **all** or **most** of their searches were performed by an intermediary such as a librarian.

Table 28. How Selected (Electronic) Announcement, Current Awareness, and Bibliographic Tools Are Searched

| Method | *RECON* | *DROLS* | *NTIS File* |
|---|---|---|---|
| | % (n) | % (n) | % (n) |
| Do **All** Searches Myself | 0.9 (1) | 17.6 (6) | 8.4 (14) |
| Do **Most** Searches Myself | 5.4 (6) | 0.0 (0) | 6.6 (11) |
| Do **Half** Myself, And **Half** Through An Intermediary | 13.4 (15) | 2.9 (1) | 7.2 (12) |
| Do **Most** Searches Through An Intermediary | 33.0 (37) | 26.5 (9) | 24.1 (40) |
| Do **All** Searches Through An Intermediary | 47.3 (53) | 52.9 (18) | 53.6 (89) |

**Use, Frequency of Use, and Importance of Federally Funded Aerospace R&D.** Survey respondents were asked if they used the results of federally funded aerospace R&D in the past year (table 29). About two-thirds indicated that they had used the results of federally funded

Table 29. Use, Frequency of Use, and Importance of Federally Funded Aerospace R&D

| Use | Percentage | Number |
|---|---|---|
| No | 35.7 | 338 |
| Frequently | 29.6 | 280 |
| Sometimes | 25.1 | 238 |
| Seldom | 8.2 | 78 |
| **Importance** | **Percentage** | **Number** |
| Very Important | 60.4 | 363 |
| Somewhat Important | 34.6 | 208 |
| Little Importance | 5.0 | 30 |

aerospace R&D in the past year. During that year, about 30% of the respondents frequently used and about 25% of the respondents sometimes used the results of federally funded aerospace R&D during the past year. About 95% of those respondents who used the results of federally funded aerospace R&D indicated that the results were **very** (60.4%) or **somewhat** (34.6%) important in performing their present professional duties.

Those who did not use the results of federally funded aerospace R&D in the past year were asked to indicate the reason(s) for non-use (table 30). A simple majority of respondents indicated "not relevant" as their reason for non-use followed by "not easily available/accessible" (30.9%) or some "other" reason for non-use.

Those who did use the results of federally funded aerospace R&D where asked to identify the problems (if any) they encountered when seeking the results of federally funded aerospace R&D (table 30). About 13% reported "no problems" when seeking the results of federally funded aerospace R&D. A simple majority of respondents, however, indicated "time required to find the information" (50.7%), "time required to obtain the information" (55.0%), and "limitations/restrictions/access" (31.7%) as problems encountered when seeking the results of federally funded aerospace R&D. About 12% and 10% of the respondents, respectively, indicated problems with either the "physical quality" or the "intellectual quality" of the information (i.e., the results of federally funded aerospace R&D).

Table 30. Reasons For Nonuse and Problems Encountered When Seeking Results of Federally Funded Aerospace R&D

| Why Not Used | Percentage | Number |
|---|---|---|
| Not Easily Available/Accessible | 30.9 | 106 |
| Not Relevant | 52.2 | 179 |
| Not Timely Or Current | 4.1 | 14 |
| Difficult To Obtain | 11.4 | 39 |
| Other | 18.1 | 62 |
| **Problems Encountered When Seeking** | **Percentage** | **Number** |
| None | 13.6 | 82 |
| Time Required **To Find** The Information | 50.7 | 307 |
| Time Required **To Obtain** The Information | 55.0 | 333 |
| Physical Quality Of The Information | 12.7 | 77 |
| Intellectual Quality Of The Information | 10.2 | 62 |
| Limitations/Restrictions/Access To The Information | 31.7 | 192 |
| Other | 8.4 | 51 |

**Use and Importance of Foreign Language Technical Reports.** Survey 3 respondents were asked if they used foreign language (i.e., non-English) technical reports (table 31). About 77%

Table 31. Use and Importance of Foreign Language Technical Reports

| Use | Percentage | Number |
|---|---|---|
| No | 77.1 | 695 |
| Frequently | 1.1 | 10 |
| Sometimes | 7.6 | 69 |
| Seldom | 13.3 | 120 |
| **Importance** | **Percentage** | **Number** |
| Very Important | 9.7 | 19 |
| Somewhat Important | 54.4 | 106 |
| Little Importance | 35.9 | 70 |

of the respondents indicated that they did **not** use foreign language technical reports. Of those using them, about 13% indicated that they "seldom" used foreign language technical reports. Those respondents who used them were asked to indicate how important foreign language technical reports were to performing their present professional duties (table 31).

Those who did not use foreign language technical reports were asked to indicate their reason(s) for non-use (table 32). "Do not read the language" was selected by 55% of the respon-

Table 32. Reasons For Nonuse of Foreign Language Technical Reports

| Reasons Not Used | Percentage | Number |
|---|---|---|
| Not Easily Available/Accessible | 37.1 | 261 |
| Not Relevant | 31.4 | 221 |
| **Do Not Read The Language** | **55.5** | **390** |
| Do Not Use Technical Reports | 5.7 | 40 |
| Time Required To Obtain Translation | 25.6 | 180 |
| Red Tape Involved In Obtaining Report | 8.4 | 59 |
| Not Reliable/Language Translation Inaccurate | 5.5 | 39 |
| Intellectual Quality of Research | 2.1 | 15 |
| Other | 3.4 | 32 |

dents, followed by "not easily available/accessible" (37.1%) and "not relevant" (31.4%). The time it takes to obtain a translation was listed as a problem by 25.6% of the respondents. The "intellectual quality of the research" was the least cited problem (2.1%).

## FINDINGS

It should be noted that the data reported in this report reflect the responses of aerospace engineers and scientists belonging to a professional society. The data may not be generalizable to aerospace engineers and scientists who are not members of professional societies or who may belong to other professional societies. Because the participants were members of a professional society, the findings may not necessarily be generalizable to the population of all U.S. aerospace engineers and scientists.

### Survey 2

1. Conference-meeting papers, journal articles, NASA technical reports and DoD technical reports, in that order, were used most frequently by survey 2 participants.

2. Journal articles, conference-meeting papers, NASA technical reports and DoD technical reports, in that order, scored the highest average (mean) importance rating.

3. The use rate (average number of times used in a 6-month period) ranged from highs of 9.0 and 8.5 for DoD and NASA technical reports to lows of 4.2 and 4.5 for technical translations and AGARD technical reports.

4. The use of technical translations, AGARD technical reports, DoD technical reports, and NASA technical reports correlated positively with their importance ratings. In all cases, the correlations were not strong, however. NASA technical reports exhibited the highest "use correlated with importance" correlation coefficient score.

5. Technical translations, AGARD technical reports, DoD technical reports, and NASA technical reports were used most frequently for the purpose of research, followed closely by management and education.

6. About technical translations:

   a. **Not relevant to my research** was the reason given by most respondents for non-use, followed by **availability/accessibility** and **takes too long to get them.**

   b. **Relevance** and **accessibility** were the factors exerting the greatest influence on their use.

7. About AGARD technical reports:

   a. **Not relevant to my research, not available/accessible,** and **not used in my discipline** were the reasons given by survey participants for their non-use.

   b. **Relevance, comprehensiveness,** and **technical quality** or **reliability** were the factors exerting the greatest influence on their use.

   c. Survey participants most frequently become aware of AGARD technical reports through **citations in a technical report, journal, or conference-meeting paper,** followed by an **intentional search of library resources** and **referred to me by a colleague.**

   d. Access to AGARD technical reports most frequently occurs by **requesting/ordering them through the library** and by **obtaining them through a colleague.**

   e. Survey respondents rated the **quality of information** highest, followed by **precision/adequacy of data** and **adequacy of data documentation.**

8. About DoD technical reports:

   a. **Not relevant to my research, not available/accessible,** and **not used in my discipline** were the reasons given by survey participants for their non-use.

   b. **Relevance** and **accessibility** were the factors exerting the greatest influence on their use.

   c. Survey participants most frequently become aware of DoD technical reports through **citations in a technical report, journal, or conference-meeting paper**, followed by **referred to me by a colleague, intentional search of library resources**, and **bibliographic data base search.**

   d. Access to DoD technical reports most frequently occurs by **requesting/ordering them through the library** and by **obtaining them through a colleague.**

   e. Survey respondents rated the **quality of information** highest, followed by **precision/ adequacy of data.**

9. About NASA technical reports:

   a. **Not relevant to my research** and **not used in my discipline** were the reasons given by survey participants for their non-use.

   b. **Accessibility** and **relevance** were the factors exerting the greatest influence on their use.

   c. Survey participants most frequently become aware of NASA technical reports through **citations in a technical report, journal, or conference-meeting paper**, followed by **referred to me by a colleague, intentional search of library resources**, and **bibliographic data base search.**

   d. Access to NASA technical reports most frequently occurs by **requesting/ordering them through the library** and by **obtaining them through a colleague.**

   e. Survey respondents rated the **quality of information** highest, followed by **precision/ adequacy of data.**

10. About two-thirds of the survey respondents and slightly more than half of the survey respondents indicated a willingness to use selected information and NASA information products in specified electronic formats. Preference for printed format was the most frequent reason given for "unlikely to use."

**Survey 3**

11. Survey 3 respondents made little use of the four print and three electronic products. Reasons for non-use included "rely on others to search for needed information," "not easily available/ accessible," and "not relevant to what I do."

12. Survey 3 participants who did use them used the four print and three electronic products for research, followed by education and management purposes.

13. **Accessibility, ease of use,** and **familiarity or experience** were the factors affecting the use of NASA *STAR.*

14. **Accessibility, ease of use, technical quality or reliability,** and **comprehensiveness** influenced the use of *NASA SP-7037.*

15. **Relevance, technical quality or reliability, accessibility,** and **ease of use** influence the use of DoD *CAB.*

16. **Technical quality or reliability, comprehensiveness,** and **relevance** influence the use of NTIS *GRA&I.*

17. **Accessibility, comprehensiveness,** and **relevance** influence the use of NASA *RECON.*

18. **Expense, accessibility, comprehensiveness,** and **relevance** influence the use of DoD *DROLS.*

19. **Accessibility, comprehensiveness, technical quality or reliability,** and **relevance** influence the use of the *NTIS File.*

20. Survey 3 respondents indicated that they did all or most searches of electronic data bases through an intermediary.

21. Those respondents who used the results of federally funded aerospace R&D (about 65%) indicated that the results were very important or somewhat important in performing their present professional duties.

22. Those respondents who did not use the results of federally funded aerospace R&D gave "not relevant" as their reason.

23. Those who used the results of federally funded aerospace R&D identified "time required to find the information" and "time required to obtain the information" as major problems they encountered when seeking the results of federally funded aerospace R&D.

24. Less than 25% of the respondents used foreign language (non-English) technical reports; "do not read the language" was the reason most frequently cited for non-use.

## CONCLUDING REMARKS

A model depicting the transfer of federally funded aerospace R&D is presented in figure 1. The narrative accompanying the figure states that the federal government has created a number of information products and services to facilitate the transfer process. The findings from the three Phase 1 (green, yellow, and white) surveys of U.S. aerospace engineers and scientists lead us to the following three conclusions: (1) the system is extremely passive and requires the user to assume the responsibility for fulfilling his/her information needs; (2) DoD and NASA technical reports do play an important role in transferring the results of federally funded aerospace R&D; and (3) U.S. aerospace engineers and scientists do not use the bibliographic tools designed to facilitate awareness and access.

Are these products and services designed primarily for the end user? If not for the end user, then for whom are these products and services designed? The system used for transferring the results of federally funded aerospace R&D is essentially an intermediary-based system, so perhaps these bibliographic tools were designed for intermediaries' use? Do information intermediaries then make use of these the bibliographic tools? Having completed the end user Phase (1) of the project, we move to Phase 2 which focuses on the role played by the information intermediary in the aerospace knowledge diffusion process. We have completed a survey of U.S. aerospace industry- affiliated information intermediaries and will be reporting the results of that survey as Report 21.

## REFERENCES


Adam, R. 1975 — "Pulling the Minds of Social Scientists Together: Towards a Science Information System." *International Social Journal* 27(3): 519-531.

Allen, T. J. 1977 — *Managing the Flow of Technology: Technology Transfer and the Dissemination of Technological Information Within the R&D Organization.* Cambridge, MA: MIT Press.

Auger, C. P. 1975 — *Use of Technical Reports Literature.* Hamden, CT: Archon Books.

Ballard, S., et. al., 1989 — *Innovation Through Technical and Scientific Information: Government and Industry Cooperation.* Westport, CT: Quorum Books.

Ballard, S., et. al., 1986 — *Improving the Transfer and Use of Scientific and Technical Information. The Federal Role: Volume 2 - Problems and Issues in the Transfer and Use of STI.* Washington, DC: National Science Foundation. (Available from NTIS, Springfield, VA; PB-87-14923.)

Bikson, T. K., B. E. Quint, and L. L. Johnson 1984 — *Scientific and Technical Information Transfer: Issues and Option.* Washington, DC: National Science Foundation. (Available from NTIS, Springfield, VA; PB-85-150357; also available as Rand Note 2131.)

Beyer, J. M. and H.M. Trice 1982 — "The Utilization Process: A Conceptual Framework and Synthesis of Empirical Findings." *Administrative Science Quarterly* 27: 591-622.

David, P. A. 1986 — "Technology Diffusion, Public Policy, and Industrial Competitiveness." In *The Positive Sum Strategy: Harnessing Technology for Economic Growth.* R. Landau and N. Rosenberg, eds. Washington, DC: National Academy Press.

Eveland, J. D. 1987 — *Scientific and Technical Information Exchange: Issues and Findings.* Washington, DC: National Science Foundation. (Not available from NTIS.)

Fry, B. M. 1953 — *Library Organization and Management of Technical Reports Literature.* Washington, DC: The Catholic University of America Press.

Gibb, J. M. and E. Phillips 1979 — Better Fate for the Grey, or Non-Conventional, Literature." *Journal of Communication Studies* 1: 225-234.

Godfrey, L. E. and H.F. Redman 1973 — *Dictionary of Report Series Codes.* (2nd ed.) NY: Special Libraries Association.

Goldhor, R. S. and R. T. Lund 1983 — "University-to-Industry Advanced Technology Transfer: A Case Study." *Research Policy* 12: 121-152.

Mathes, J. C. and D. W. Stevenson 1976 — *Designing Technical Reports.* Indianapolis, IN: Bobbs-Merrill.

McClure, C. R. 1988 — "The Federal Technical Report Literature: Research Needs and Issues." *Government Information Quarterly* 5(1): 27-44.

McGowan, R. P. and S. Loveless 1981 — "Strategies for Information Management: The Administrator's Perspective." *Public Administration Review* 41(3): 331-339.

Mowery, D. C. 1983 — "Economic Theory and Government Technology Policy." *Policy Sciences* 16: 27-43.

Mowery, D. C. and N. Rosenberg 1979 — "The Influence of Market Demand Upon Innovation: A Critical Review of Some Recent Empirical Studies." *Research Policy* 8(2): 102-153.

National Academy of Sciences - National Academy of Engineering 1969 — *Scientific and Technical Communication: A Pressing National Problem and Recommendations for Its Solution.* Report by the Committee on Scientific and Technical Communication. Washington, DC: National Academy Sciences; AKA the SATCOM Report.

Pinelli, T. E. January 1991 — *The Relationship Between the Use of U.S. Government Technical Reports by U.S. Aerospace Engineers and Scientists and Selected Institutional and Sociometric Variables.* NASA TM-102774. Washington, DC: National Aeronautics and Space Administration. (Available from NTIS, Springfield, VA; 91N18898.)

Pinelli, T. E., J. M. Kennedy, and R. O. Barclay 1991 — "The NASA/DoD Aerospace Knowledge Diffusion Research Project." *Government Information Quarterly* 8(2): 219-233.

Pinelli, T. E., J. M. Kennedy, R. O. Barclay, and T. F. White 1991 — "Aerospace Knowledge Diffusion Research." *World Aerospace Technology '91: The International Review of Aerospace Design and Development* 1(1): 31-34.

President's Special Assistant for Science and Technology 1962 — *Scientific and Technological Communication in the Government.* Washington, DC: Government Printing Office; AKA the Crawford Report.

Redman, H. F. 1965/1966 — "Technical Reports: Problems and Predictions." *Arizona Librarian* 23: 11-17.

Roberts, E. B. and A. L. Frohman 1978 — "Strategies for Improving Research Utilization." *Technology Review* 80 (March/April): 32-39.

Ronco, P. G., et. al. 1964 — *Characteristics of Technical Reports That Affect Reader Behavior: A Review of the Literature.* Boston, MA: Tufts University, Institute for Psychological Research. (Available from NTIS, Springfield, VA PB-169 409.)

Shuchman, H. L. 1981 — *Information Transfer in Engineering.* Glastonbury, CT: The Futures Group.

Smith, R. S. 1981 — "Interaction Within the Technical Report Community." *Science and Technology Libraries* 1(4): 5-18.

Subramanyam, K. 1981 — *Scientific and Technical Information Resources.* NY: Marcel Dekker.

U.S. Department of Defense 1964 — *Glossary of Information Handling.* Defense Logistics Agency, Defense Documentation Center. Cameron Station, Alexandria, VA.

Williams, F. and D. V. Gibson 1990 — *Technology Transfer: A Communication Perspective.* Newbury Park, CA: Sage Publications.

# APPENDIX A

# NASA/DoD AEROSPACE KNOWLEDGE DIFFUSION RESEARCH PROJECT

## Fact Sheet

The production, transfer, and use of scientific and technical information (STI) is an essential part of aerospace R&D. We define STI production, transfer, and use as *Aerospace Knowledge Diffusion*. Studies tell us that timely access to STI can increase productivity and innovation and help aerospace engineers and scientists maintain and improve their professional skills. These same studies remind us that we know little about aerospace knowledge diffusion or about how aerospace engineers and scientists find and use STI. To learn more about this process, we have organized a research project to study knowledge diffusion. Sponsored by NASA and the Department of Defense (DoD), the NASA/DoD Aerospace Knowledge Diffusion Research Project is being conducted by researchers at the NASA Langley Research Center, the Indiana University Center for Survey Research, and Rensselaer Polytechnic Institute. This research is endorsed by several aerospace professional societies including the AIAA, RAeS, and DGLR and has been sanctioned by the AGARD and AIAA Technical Information Panels.

This 4-phase project is providing descriptive and analytical data regarding the flow of STI at the individual, organizational, national, and international levels. It is examining both the channels used to communicate STI and the social system of the aerospace knowledge diffusion process. Phases 1 investigates the information-seeking habits and practices of U.S. aerospace engineers and scientists and places particular emphasis on their use of government funded aerospace STI. Phase 2 examines the industry-government interface and places special emphasis on the role of the information intermediary in the knowledge diffusion process. Phase 3 concerns the academic-government interface and places specific emphasis on the information intermediary-faculty-student interface. Phase 4 explores the information-seeking behavior of non-U.S. aerospace engineers and scientists from Brazil, Western Europe, India, Israel, Japan, and the Soviet Union.

The results will help us to understand the flow of STI at the individual, organizational, national, and international levels. The results of our research will contribute to increasing productivity and to improving and maintaining the professional competence of aerospace engineers and scientists. They can be used to identify and correct deficiencies, to improve access and use, to plan new aerospace STI systems, and should provide useful information to R&D managers, information managers, and others concerned with improving access to and utilization of STI. The results of our research are being shared freely with those who participate in the study. You can get copies of the project publications by contacting Dr. Pinelli.


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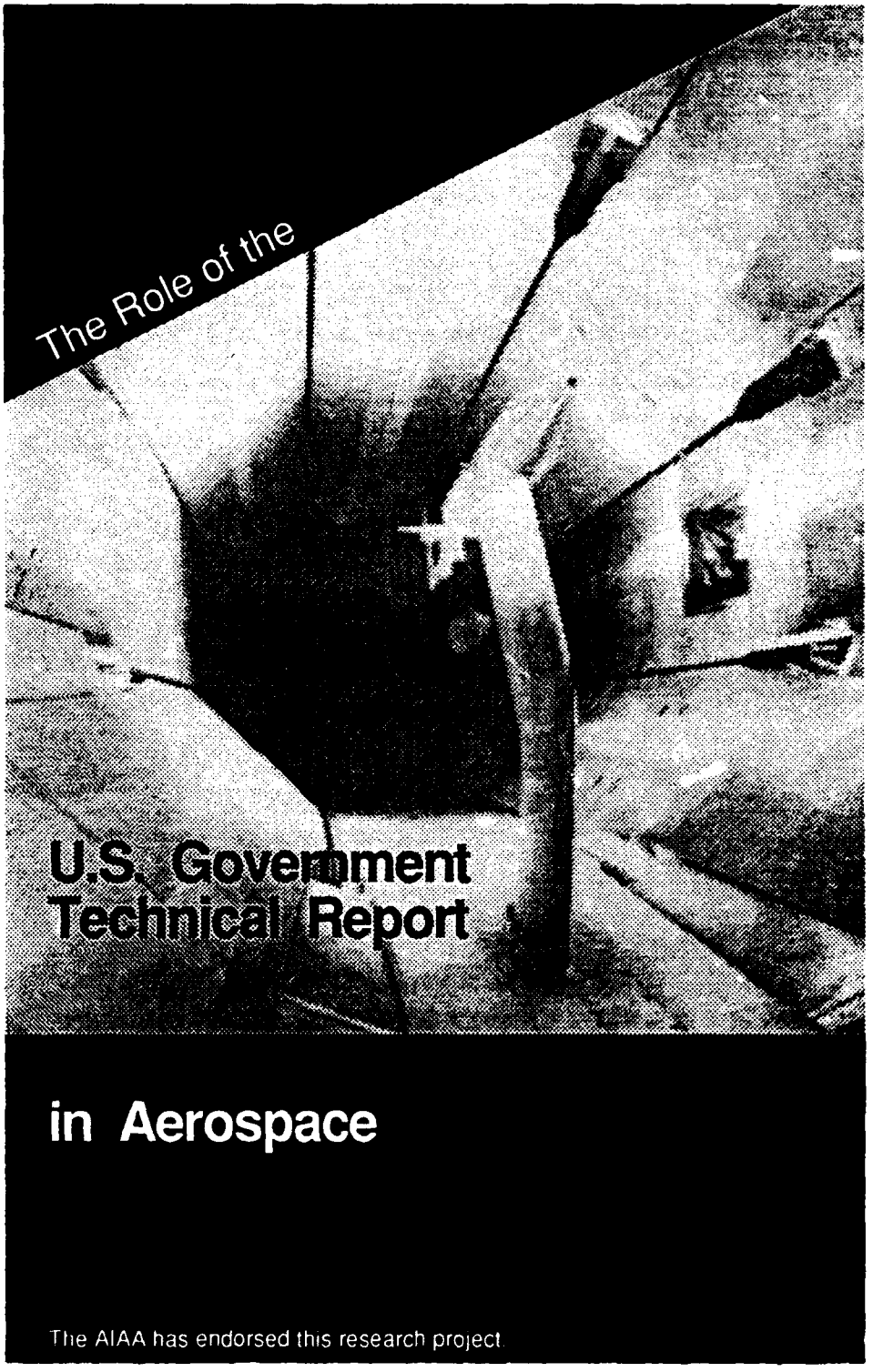
# APPENDIX B

## AIAA Survey 2 Questionnaire



**These data will help us determine the use and importance of selected information products by aerospace engineers and scientists.**

1. Which of the following information sources do YOU use in performing YOUR present professional duties? (Circle answer)

| | | |
|---|---|---|
| CONFERENCE/MEETING PAPERS..... | YES | NO |
| JOURNAL ARTICLES..... | YES | NO |
| TECHNICAL TRANSLATIONS..... | YES | NO |
| TECHNICAL REPORTS - AGARD..... | YES | NO |
| TECHNICAL REPORTS - DOD..... | YES | NO |
| TECHNICAL REPORTS - NASA..... | YES | NO |

2. In terms of performing YOUR present professional duties, how important is each of the following information sources? (Circle number)

| | VERY IMPORTANT | | | | NOT AT ALL IMPORTANT |
|---|---|---|---|---|---|
| CONFERENCE/MEETING PAPERS..... | 1 | 2 | 3 | 4 | 5 |
| JOURNAL ARTICLES..... | 1 | 2 | 3 | 4 | 5 |
| TECHNICAL TRANSLATIONS..... | 1 | 2 | 3 | 4 | 5 |
| TECHNICAL REPORTS - AGARD..... | 1 | 2 | 3 | 4 | 5 |
| TECHNICAL REPORTS - DOD..... | 1 | 2 | 3 | 4 | 5 |
| TECHNICAL REPORTS - NASA..... | 1 | 2 | 3 | 4 | 5 |

**These data will help us gather specific information about technical translations.**

3. In the past SIX MONTHS, about how many times did YOU use a TECHNICAL TRANSLATION? (Circle none or enter the number)

NONE
____ NUMBER

If 1 or more, what percentage of the TECHNICAL TRANSLATIONS were in:
_____% Paper
_____% Microfiche

What percentage of these TECHNICAL TRANSLATIONS were used for the following purposes:
_____% Education
_____% Research
_____% Management
_____% Other

*GO TO Q 4.*

If NONE, why did YOU NOT use TECHNICAL TRANSLATIONS? (Circle answer)

| | | |
|---|---|---|
| NOT AVAILABLE/ACCESSIBLE..... | YES | NO |
| NOT RELEVANT TO MY RESEARCH.... | YES | NO |
| NOT USED IN MY DISCIPLINE..... | YES | NO |
| NOT RELIABLE/TECHNICALLY INACCURATE..... | YES | NO |
| NOT RELIABLE/LANGUAGE INACCURATE..... | YES | NO |
| NOT TIMELY/CURRENT..... | YES | NO |
| TAKES TOO LONG TO GET THEM..... | YES | NO |

*IF NONE, PLEASE GO TO AGARD TECHNICAL REPORTS, Q 5, Page 2.*

4. To what extent has each of the following factors influenced YOUR use of TECHNICAL TRANSLATIONS? (Circle number)

| | GREATLY INFLUENCED | | | | NOT INFLUENCED |
|---|---|---|---|---|---|
| ACCESSIBILITY: the ease of getting to the information source | 1 | 2 | 3 | 4 | 5 |
| EASE OF USE: the ease of comprehending or utilizing the information | 1 | 2 | 3 | 4 | 5 |
| EXPENSE: low cost in comparison to other information sources | 1 | 2 | 3 | 4 | 5 |
| FAMILIARITY OR EXPERIENCE: prior knowledge or previous use of the information source | 1 | 2 | 3 | 4 | 5 |
| TECHNICAL QUALITY OR RELIABILITY: the information was expected to be the best in terms of quality, accuracy, and reliability | 1 | 2 | 3 | 4 | 5 |
| COMPREHENSIVENESS: the expectation that the information source would provide broad coverage of the available knowledge | 1 | 2 | 3 | 4 | 5 |
| RELEVANCE: the expectation that a high percentage of the information retrieved from the source would be used | 1 | 2 | 3 | 4 | 5 |

**These data will help us gather specific information from aerospace engineers and scientists about AGARD, DOD, and NASA technical reports.**

5. In the past SIX MONTHS, about how many times did YOU use an AGARD TECHNICAL REPORT? (Circle none or enter the number)

NONE
_____ NUMBER

If 1 or more, what percentage of the AGARD TECHNICAL REPORTS were in:

_____% Paper
_____%Microfiche

What percentage of these AGARD TECHNICAL REPORTS were used for the following purposes:

_____% Education
_____% Research
_____% Management
_____% Other

*GO TO Q 6.*

If NONE, why did YOU NOT use an AGARD TECHNICAL REPORT? (Circle answer)

| | | |
|---|---|---|
| NOT AVAILABLE/ACCESSIBLE | YES | NO |
| NOT RELEVANT TO MY RESEARCH | YES | NO |
| NOT USED IN MY DISCIPLINE | YES | NO |
| NOT RELIABLE/TECHNICALLY INACCURATE | YES | NO |
| NOT TIMELY/CURRENT | YES | NO |

OTHER _____

*IF NONE, PLEASE GO TO DOD TECHNICAL REPORTS, Q 10, Page 4.*

6. How often do you find out about AGARD TECHNICAL REPORTS from each of these sources? (Circle number)

| | FREQUENTLY | SOMETIMES | SELDOM | NEVER |
|---|---|---|---|---|
| Bibliographic database search | 1 | 2 | 3 | 4 |
| Announcement journal (e.g., STAR) | 1 | 2 | 3 | 4 |
| Current awareness publication (e.g., SCAN) | 1 | 2 | 3 | 4 |
| Cited in a report/journal/conference paper | 1 | 2 | 3 | 4 |
| Referred to me by colleague | 1 | 2 | 3 | 4 |
| Referred to me by librarian/technical information specialist | 1 | 2 | 3 | 4 |
| Routed to me by library | 1 | 2 | 3 | 4 |
| By intentional search of library resources | 1 | 2 | 3 | 4 |
| By accident, by browsing, or looking for other material | 1 | 2 | 3 | 4 |
| AGARD sends them to me | 1 | 2 | 3 | 4 |
| The author sends them to me | 1 | 2 | 3 | 4 |
| Other _____ | 1 | 2 | 3 | 4 |

7. How often do you usually obtain physical access to AGARD TECHNICAL REPORTS from each of these sources? (Circle number)

| | FREQUENTLY | SOMETIMES | SELDOM | NEVER |
|---|---|---|---|---|
| AGARD sends them to me | 1 | 2 | 3 | 4 |
| The author sends them to me | 1 | 2 | 3 | 4 |
| I request them from the author | 1 | 2 | 3 | 4 |
| I request/order them from my library | 1 | 2 | 3 | 4 |
| I request/order them from NTIS | 1 | 2 | 3 | 4 |
| I get them from a colleague | 1 | 2 | 3 | 4 |
| They are routed to me by my library | 1 | 2 | 3 | 4 |
| Other_____ | 1 | 2 | 3 | 4 |

8. How would you rate AGARD TECHNICAL REPORTS on each of the following characteristics? (Circle number)

| | EXCELLENT | GOOD | FAIR | POOR | NO OPINION |
|---|---|---|---|---|---|
| Quality of information | 1 | 2 | 3 | 4 | 5 |
| Precision/accuracy of data | 1 | 2 | 3 | 4 | 5 |
| Adequacy of data/documentation | 1 | 2 | 3 | 4 | 5 |
| Organization/format | 1 | 2 | 3 | 4 | 5 |
| Quality of graphics (e.g., charts, photos, figures) | 1 | 2 | 3 | 4 | 5 |

*RATING AGARD TECHNICAL REPORTS*

| | | | | | |
|---|---|---|---|---|---|
| Timeliness/currency | 1 | 2 | 3 | 4 | 5 |
| "Advancing the state of the art" in your discipline | 1 | 2 | 3 | 4 | 5 |

9. To what extent has each of the following factors influenced YOUR use of AGARD TECHNICAL REPORTS? (Circle number)

| | GREATLY INFLUENCED | | | | NOT INFLUENCED |
|---|---|---|---|---|---|
| ACCESSIBILITY: the ease of getting to the information source | 1 | 2 | 3 | 4 | 5 |
| EASE OF USE: the ease of comprehending or utilizing the information | 1 | 2 | 3 | 4 | 5 |
| EXPENSE: low cost in comparison to other information sources | 1 | 2 | 3 | 4 | 5 |
| FAMILIARITY OR EXPERIENCE: prior knowledge or previous use of the information source | 1 | 2 | 3 | 4 | 5 |
| TECHNICAL QUALITY OR RELIABILITY: the information was expected to be the best in terms of quality, accuracy, and reliability | 1 | 2 | 3 | 4 | 5 |
| COMPREHENSIVENESS: the expectation that the information source would provide broad coverage of the available knowledge | 1 | 2 | 3 | 4 | 5 |
| RELEVANCE: the expectation that a high percentage of the information retrieved from the source would be used | 1 | 2 | 3 | 4 | 5 |

10. In the past SIX MONTHS, about how many times did YOU use a DOD TECHNICAL REPORT? (Circle none or enter the number)

NONE
____ NUMBER

If 1 or more, what percentage of the DOD TECHNICAL REPORTS were in:

____% Paper
____% Microfiche

What percentage of these DOD TECHNICAL REPORTS were used for the following purposes:

____% Education
____% Research
____% Management
____% Other

*GO TO Q 11.*

If NONE, why did YOU NOT use a DOD TECHNICAL REPORT? (Circle answer)

| | | |
|---|---|---|
| NOT AVAILABLE/ACCESSIBLE | YES | NO |
| NOT RELEVANT TO MY RESEARCH | YES | NO |
| NOT USED IN MY DISCIPLINE | YES | NO |
| NOT RELIABLE/TECHNICALLY INACCURATE | YES | NO |
| NOT TIMELY/CURRENT | YES | NO |

OTHER _____

*IF NONE, PLEASE GO TO NASA TECHNICAL REPORTS, Q 15, Page 6.*

11. How often do you find out about DOD TECHNICAL REPORTS from each of these sources? (Circle number)

| | FREQUENTLY | SOMETIMES | SELDOM | NEVER |
|---|---|---|---|---|
| Bibliographic database search | 1 | 2 | 3 | 4 |
| Announcement journal (e.g., STAR) | 1 | 2 | 3 | 4 |
| Current awareness publication (e.g., SCAN) | 1 | 2 | 3 | 4 |
| Cited in a report/journal/conference paper | 1 | 2 | 3 | 4 |
| Referred to me by colleague | 1 | 2 | 3 | 4 |
| Referred to me by librarian/technical information specialist | 1 | 2 | 3 | 4 |
| Routed to me by library | 1 | 2 | 3 | 4 |
| By intentional search of library resources | 1 | 2 | 3 | 4 |
| By accident, by browsing, or looking for other material | 1 | 2 | 3 | 4 |
| DOD sends them to me | 1 | 2 | 3 | 4 |
| The author sends them to me | 1 | 2 | 3 | 4 |
| Other _____ | 1 | 2 | 3 | 4 |

12. How often do you usually obtain physical access to DOD TECHNICAL REPORTS from each of these sources? (Circle number)

| | FREQUENTLY | SOMETIMES | SELDOM | NEVER |
|---|---|---|---|---|
| DOD sends them to me | 1 | 2 | 3 | 4 |
| The author sends them to me | 1 | 2 | 3 | 4 |
| I request them from the author | 1 | 2 | 3 | 4 |
| I request/order them from my library | 1 | 2 | 3 | 4 |
| I request/order them from NTIS | 1 | 2 | 3 | 4 |
| I get them from a colleague | 1 | 2 | 3 | 4 |
| They are routed to me by my library | 1 | 2 | 3 | 4 |
| Other _____ | 1 | 2 | 3 | 4 |

13. How would you rate DOD TECHNICAL REPORTS on each of the following characteristics? (Circle number)

| | EXCELLENT | GOOD | FAIR | POOR | NO OPINION |
|---|---|---|---|---|---|
| Quality of information | 1 | 2 | 3 | 4 | 5 |
| Precision/accuracy of data | 1 | 2 | 3 | 4 | 5 |
| Adequacy of data/documentation | 1 | 2 | 3 | 4 | 5 |
| Organization/format | 1 | 2 | 3 | 4 | 5 |
| Quality of graphics (e.g., charts, photos, figures) | 1 | 2 | 3 | 4 | 5 |

*RATING DOD TECHNICAL REPORTS*

| | | | | | |
|---|---|---|---|---|---|
| Timeliness/currency..... | 1 | 2 | 3 | 4 | 5 |
| "Advancing the state of the art" in your discipline..... | 1 | 2 | 3 | 4 | 5 |

14. To what extent has each of the following factors influenced YOUR use of DOD TECHNICAL REPORTS? (Circle number)

| | GREATLY INFLUENCED | | | | NOT INFLUENCED |
|---|---|---|---|---|---|
| ACCESSIBILITY: the ease of getting to the information source ..... | 1 | 2 | 3 | 4 | 5 |
| EASE OF USE: the ease of comprehending or utilizing the information ..... | 1 | 2 | 3 | 4 | 5 |
| EXPENSE: low cost in comparison to other information sources ..... | 1 | 2 | 3 | 4 | 5 |
| FAMILIARITY OR EXPERIENCE: prior knowledge or previous use of the information source ..... | 1 | 2 | 3 | 4 | 5 |
| TECHNICAL QUALITY OR RELIABILITY: the information was expected to be the best in terms of quality, accuracy, and reliability ..... | 1 | 2 | 3 | 4 | 5 |
| COMPREHENSIVENESS: the expectation that the information source would provide broad coverage of the available knowledge..... | 1 | 2 | 3 | 4 | 5 |
| RELEVANCE: the expectation that a high percentage of the information retrieved from the source would be used ..... | 1 | 2 | 3 | 4 | 5 |

15. In the past SIX MONTHS, about how many times did YOU use a NASA TECHNICAL REPORT? (Circle none or enter number)

NONE
_____ NUMBER

If 1 or more, what percentage of the NASA TECHNICAL REPORTS were in:

_____% Paper
_____% Microfiche

What percentage of these NASA TECHNICAL REPORTS were used for the following purposes:

_____% Education
_____% Research
_____% Management
_____% Other

*GO TO Q 16.*

If NONE, why did YOU NOT use an NASA TECHNICAL REPORT? (Circle answer)

| | | |
|---|---|---|
| NOT AVAILABLE/ACCESSIBLE..... | YES | NO |
| NOT RELEVANT TO MY RESEARCH.... | YES | NO |
| NOT USED IN MY DISCIPLINE..... | YES | NO |
| NOT RELIABLE/TECHNICALLY INACCURATE..... | YES | NO |
| NOT TIMELY/CURRENT..... | YES | NO |
| OTHER _____..... | YES | NO |

*IF NONE, PLEASE GO TO Q 20, Page 9.*

16. How often do you find out about NASA TECHNICAL REPORTS from each of these sources? (Circle number)

| | FREQUENTLY | SOMETIMES | SELDOM | NEVER |
|---|---|---|---|---|
| Bibliographic database search | 1 | 2 | 3 | 4 |
| Announcement journal (e.g., STAR) | 1 | 2 | 3 | 4 |
| Current awareness publication (e.g., SCAN) | 1 | 2 | 3 | 4 |
| Cited in a report/journal/conference paper | 1 | 2 | 3 | 4 |
| Referred to me by colleague | 1 | 2 | 3 | 4 |
| Referred to me by librarian/ technical information specialist | 1 | 2 | 3 | 4 |
| Routed to me by library | 1 | 2 | 3 | 4 |
| By intentional search of library resources | 1 | 2 | 3 | 4 |
| By accident, by browsing, or looking for other material | 1 | 2 | 3 | 4 |
| NASA sends them to me | 1 | 2 | 3 | 4 |
| The author sends them to me | 1 | 2 | 3 | 4 |
| Other _____ | 1 | 2 | 3 | 4 |

17. How often do you usually obtain physical access to NASA TECHNICAL REPORTS from each of these sources? (Circle number)

| | FREQUENTLY | SOMETIMES | SELDOM | NEVER |
|---|---|---|---|---|
| NASA sends them to me | 1 | 2 | 3 | 4 |
| The author sends them to me | 1 | 2 | 3 | 4 |
| I request them from the author | 1 | 2 | 3 | 4 |
| I request/order them from my library | 1 | 2 | 3 | 4 |
| I request/order them from NTIS | 1 | 2 | 3 | 4 |
| I get them from a colleague | 1 | 2 | 3 | 4 |
| They are routed to me by my library | 1 | 2 | 3 | 4 |
| Other _____ | 1 | 2 | 3 | 4 |

18. How would you rate NASA TECHNICAL REPORTS on each of the following characteristics? (Circle number)

| | Excellent | Good | Fair | Poor | No Opinion |
|---|---|---|---|---|---|
| Quality of information | 1 | 2 | 3 | 4 | 5 |
| Precision/accuracy of data | 1 | 2 | 3 | 4 | 5 |
| Adequacy of data/documentation | 1 | 2 | 3 | 4 | 5 |
| Organization/format | 1 | 2 | 3 | 4 | 5 |
| Quality of graphics (e.g., charts, photos, figures) | 1 | 2 | 3 | 4 | 5 |
| Timeliness/currency | 1 | 2 | 3 | 4 | 5 |
| "Advancing the state of the art" in your discipline | 1 | 2 | 3 | 4 | 5 |

19. To what extent has each of the following factors influenced YOUR use of NASA TECHNICAL REPORTS? (Circle number)

| | GREATLY INFLUENCED | | | | NOT INFLUENCED |
|---|---|---|---|---|---|
| ACCESSIBILITY: the ease of getting to the information source | 1 | 2 | 3 | 4 | 5 |
| EASE OF USE: the ease of comprehending or utilizing the information | 1 | 2 | 3 | 4 | 5 |
| EXPENSE: low cost in comparison to other information sources | 1 | 2 | 3 | 4 | 5 |
| FAMILIARITY OR EXPERIENCE: prior knowledge or previous use of the information source | 1 | 2 | 3 | 4 | 5 |
| TECHNICAL QUALITY OR RELIABILITY: the information was expected to be the best in terms of quality, accuracy, and reliability | 1 | 2 | 3 | 4 | 5 |
| COMPREHENSIVENESS: the expectation that the information source would provide broad coverage of the available knowledge | 1 | 2 | 3 | 4 | 5 |
| RELEVANCE: the expectation that a high percentage of the information retrieved from the source would be used | 1 | 2 | 3 | 4 | 5 |

Extensive data tabulations, mathematical presentations, and lengthy computer programs are usually printed in the Appendix of NASA technical reports. How likely would YOU be to use this type of information if it was provided in electronic format (e.g., floppy disk) rather than in printed form? (Circle number.)

**20.** Data Tables/Mathematical Presentations

1 VERY UNLIKELY
2 SOMEWHAT UNLIKELY → **21.** Which best explains your reason for being unlikely to use Data Tables/ Mathematical Presentations in electronic format? (Circle number.)

3 SOMEWHAT LIKELY
4 VERY LIKELY

1 NO/LIMITED COMPUTER ACCESS
2 HARDWARE/SOFTWARE INCOMPATIBILITY
3 PREFER PRINTED FORMAT
4 OTHER _____

**22.** Computer Program Listings

1 VERY UNLIKELY
2 SOMEWHAT UNLIKELY → **23.** Which best explains your reason fo being unlikely to use Computer Program Listings in electronic format? (Circle number.)

3 SOMEWHAT LIKELY
4 VERY LIKELY

1 NO/LIMITED COMPUTER ACCESS
2 HARDWARE/SOFTWARE INCOMPATIBILITY
3 PREFER PRINTED FORMAT
4 OTHER_____

**24.** NASA technical reports come in both paper and microfiche format. How likely would YOU be to use a computerized, online system (with full text and graphics) for NASA technical reports? (Circle number.)

1 VERY UNLIKELY
2 SOMEWHAT UNLIKELY → **25.** Which best explains your reason for being unlikely to use a computerized, online system for NASA technical reports? (Circle number.)

3 SOMEWHAT LIKELY
4 VERY LIKELY

1 NO/LIMITED COMPUTER ACCESS
2 HARDWARE/SOFTWARE INCOMPATIBILITY
3 PREFER PRINTED FORMAT
4 OTHER_____

**26.** NASA technical reports come in both paper and microfiche format. How likely would YOU be to use a CD-ROM system (with full text and graphics) for NASA technical reports? (Circle number.)

1 VERY UNLIKELY
2 SOMEWHAT UNLIKELY → **27.** Which best explains your reason for being unlikely to use a CD-ROM system for NASA technical reports? (Circle number.)

3 SOMEWHAT LIKELY
4 VERY LIKELY

1 NO/LIMITED COMPUTER ACCESS
2 HARDWARE/SOFTWARE INCOMPATIBILITY
3 PREFER PRINTED FORMAT
4 OTHER _____

*GO TO Q 28.*

**Finally, we would like to collect some background information that will be helpful with the analysis of the data.**

28. Which is the highest level of education that YOU have completed? (Circle one number)

1 NO DEGREE
2 TECHNICAL OR VOCATIONAL DEGREE
3 BACHELOR'S DEGREE
4 MASTER'S DEGREE
5 DOCTORATE
6 POST DOCTORATE
7 OTHER _____

29. Are you trained as: (Circle number)

1 AN ENGINEER
2 A SCIENTIST
3 OTHER_____

30. Would your present professional duties be classified as: (Circle number)

1 AN ENGINEER
2 A SCIENTIST
3 OTHER_____

31. How many years of professional work experience in aerospace do you have?

_____ YEARS in aerospace

32. Is the type of organization where YOU work: (Circle ONLY one number)

1 ACADEMIC
2 GOVERNMENT (DOD)
3 GOVERNMENT (NASA)
4 GOVERNMENT (OTHER)
5 INDUSTRIAL
6 NOT-FOR-PROFIT
7 RETIRED OR NOT EMPLOYED
8 OTHER _____

33. What is YOUR primary professional duty? (Circle ONLY one number)

1 ACADEMIC/TEACHING (may include research)
2 RESEARCH
3 ADMINISTRATIVE/MANAGEMENT (profit sector)
4 TECHNICAL ADMINISTRATIVE/ MANAGEMENT (profit sector)
5 ADMINISTRATIVE/MANAGEMENT (Government, non-profit)
6 TECHNICAL ADMINISTRATIVE/ MANAGEMENT (Government, non-profit)
7 DESIGN/DEVELOPMENT/RDTE
8 MANUFACTURING/PRODUCTION
9 MARKETING/SALES
10 SERVICE/MAINTENANCE
11 PRIVATE CONSULTANT
12 OTHER _____

34. What is YOUR principle AIAA interest group? (Circle ONLY one number)

1 AEROSPACE SCIENCES
2 AIRCRAFT SYSTEMS
3 INFORMATION & LOGISTICS SYSTEMS
4 PROPULSION & ENERGY
5 SPACE & MISSILE SYSTEMS
6 STRUCTURES, DESIGN & TEST
7 OTHER _____

35. Which of the following best characterizes YOUR area of work or the application of YOUR work? (Circle ONLY one number)

1 AERONAUTICS
2 ASTRONAUTICS
3 ENGINEERING
4 GEOSCIENCES
5 LIFE SCIENCES
6 MATHEMATICAL & COMPUTER SCIENCES
7 MATERIALS & CHEMISTRY
8 PHYSICS
9 SPACE SCIENCES
10 OTHER _____

36. Is ANY of YOUR current work funded by the Federal Government? (Circle answer)

YES NO

**OVER**

37. Who supplies the largest proportion of funds for YOUR current research/project(s)? (Circle number)

1 FEDERAL GOVERNMENT
2 PRIVATE INDUSTRY
3 EDUCATIONAL INSTITUTION
4 NON-PROFIT INSTITUTION
5 OTHER (specify) _____

## OPTIONAL QUESTIONS

38. What, in your opinion, is the greatest problem(s) in finding out about and obtaining the results of federally-funded aerospace R&D?

_____

_____

_____

_____

_____

39. What suggestions can you offer for improving access to the results of federally-funded aerospace R&D?

_____

_____

_____

_____

_____

40. Is there anything else YOU would care to say regarding this research?

_____

_____

_____

_____

_____

Mail to:
1022 East Third Street
Indiana University
Bloomington, IN 47401

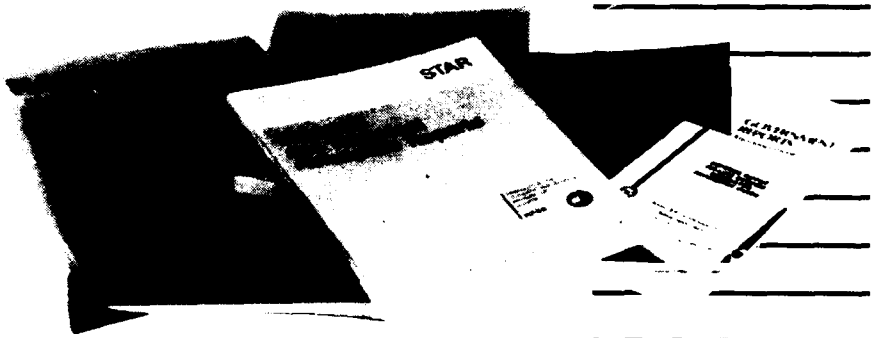
## APPENDIX C

## AIAA Survey 3 Questionnaire

THE ROLE OF THE

# U.S. Government Technical Report

IN AEROSPACE




The AIAA has endorsed this research project.

**These data will help determine the use of announcement, current awareness, and bibliographic tools used for government technical reports by aerospace engineers and scientists.**

1. Do you use **STAR**, the NASA biweekly announcement journal that covers technical reports? (Circle number)

   1 NO →
   2 YES, Frequently
   3 YES, Sometimes
   4 YES, Seldom

2. Are you familiar with **STAR**? (Circle number)

   1 NO → **PLEASE GO TO Q7 ON PAGE 2**
   2 YES

4. Why don't you use **STAR**? (Circle all that apply)

   a Not Easily Available/Accessible
   b Not Relevant For What I Do
   c Don't Use Technical Reports
   d Can Get The Same Information More Easily From Another Source
   e Rely On Others (e.g., Librarian) To Search For Relevant/Needed Information
   f Difficult To Obtain What's In There
   g Other_____

   **PLEASE GO TO Q7 ON PAGE 2**

3. In terms of performing your present professional duties, how important is **STAR**? (Circle number)

   1 VERY IMPORTANT
   2 SOMEWHAT IMPORTANT
   3 OF LITTLE IMPORTANCE

5. In the past six months, what percentage of your use of **STAR** was for educational purposes (e.g., teaching, professional development); research (basic and/or applied); and for the management (e.g., planning, budgeting) of research?

   _____% EDUCATIONAL
   _____% RESEARCH
   _____% MANAGEMENT
   _____% OTHER
   100 % TOTAL

6. To what extent has each of the following factors influenced your use of **STAR**? For each factor (e.g., accessibility), please indicate by circling from 1 to 5 how much this reason influenced your decision.

| | GREATLY INFLUENCED | | | | NOT INFLUENCED |
|---|---|---|---|---|---|
| a ACCESSIBILITY: the ease of getting to the information source . . . . . | 1 | 2 | 3 | 4 | 5 |
| b EASE OF USE: the ease of comprehending or utilizing the information . . . . . | 1 | 2 | 3 | 4 | 5 |
| c EXPENSE: low cost in comparison to other information sources . . . . . | 1 | 2 | 3 | 4 | 5 |
| d FAMILIARITY OR EXPERIENCE: prior knowledge or previous use of the information source . . . . . | 1 | 2 | 3 | 4 | 5 |
| e TECHNICAL QUALITY OR RELIABILITY: the information was expected to be the best in terms of quality, accuracy, and reliability . . . . . | 1 | 2 | 3 | 4 | 5 |
| f COMPREHENSIVENESS: the expectation that the information source would provide broad coverage of the available knowledge | 1 | 2 | 3 | 4 | 5 |
| g RELEVANCE: the expectation that a high percentage of the information retrieved from the source would be used . . . . . | 1 | 2 | 3 | 4 | 5 |

7. Do you use **Aeronautical Engineering: A Continuing Bibliography With Indexes (NASA SP-7037)**, the NASA monthly announcement journal that covers technical reports, journal articles, and other documents on the engineering and theoretical aspects of aircraft and associated components, equipment, and systems? (Circle number)

1 NO → 8

2 YES, Frequently
3 YES, Sometimes
4 YES, Seldom

10. In terms of performing your present professional duties, how important is **NASA SP-7037**? (Circle number)

1 VERY IMPORTANT
2 SOMEWHAT IMPORTANT
3 OF LITTLE IMPORTANCE

11. In the past six months, what percentage of your use of **NASA SP-7037** was for educational purposes (e.g., teaching, professional development); research (basic and/or applied); and for the management (e.g., planning, budgeting) of research?

_____% EDUCATIONAL
_____% RESEARCH
_____% MANAGEMENT
_____% OTHER
100 % TOTAL

8. Are you familiar with **NASA SP-7037**? (Circle number)

1 NO → **PLEASE GO TO Q13 ON PAGE 3**
2 YES

9. Why don't you use **NASA SP-7037**? (Circle all that apply)

a Not Easily Available/Accessible
b Not Relevant For What I Do
c Don't Use Technical Reports
d Can Get The Same Information More Easily From Another Source
e Rely On Others (e.g., Librarian) To Search For Relevant/Needed Information
f Difficult To Obtain What's In There
g Other_____

**PLEASE GO TO Q13 ON PAGE 3**

12. To what extent has each of the following factors influenced your use of **NASA SP-7037**? For each factor (e.g., accessibility), please indicate by circling from 1 to 5 how much this reason influenced your decision.

| | GREATLY INFLUENCED | | | | NOT INFLUENCED |
|---|---|---|---|---|---|
| a ACCESSIBILITY: the ease of getting to the information source . . . . . | 1 | 2 | 3 | 4 | 5 |
| b EASE OF USE: the ease of comprehending or utilizing the information . . . . . | 1 | 2 | 3 | 4 | 5 |
| c EXPENSE: low cost in comparison to other information sources . . . . . | 1 | 2 | 3 | 4 | 5 |
| d FAMILIARITY OR EXPERIENCE: prior knowledge or previous use of the information source . . . . . | 1 | 2 | 3 | 4 | 5 |
| e TECHNICAL QUALITY OR RELIABILITY: the information was expected to be the best in terms of quality, accuracy, and reliability . . . . . | 1 | 2 | 3 | 4 | 5 |
| f COMPREHENSIVENESS: the expectation that the information source would provide broad coverage of the available knowledge | 1 | 2 | 3 | 4 | 5 |
| g RELEVANCE: the expectation that a high percentage of the information retrieved from the source would be used . . . | 1 | 2 | 3 | 4 | 5 |

13. Do you use **CAB**, the DOD biweekly profile-based bibliography that covers technical reports? (Circle number)

1 NO → PLEASE GO TO Q14 ON PAGE 4
2 YES, Frequently
3 YES, Sometimes
4 YES, Seldom

16. In terms of performing your present professional duties, how important is **CAB**? (Circle number)

1 VERY IMPORTANT
2 SOMEWHAT IMPORTANT
3 OF LITTLE IMPORTANCE

17. In the past six months, what percentage of your use of **CAB** was for educational purposes (e.g., teaching, professional development); research (basic and/or applied); and for the management (e.g., planning, budgeting) of research?

_____% EDUCATIONAL
_____% RESEARCH
_____% MANAGEMENT
_____% OTHER
_100____% TOTAL

14. Are you familiar with **CAB**? (Circle number)

1 NO → **PLEASE GO TO Q19 ON PAGE 4**
2 YES

15. Why don't you use **CAB**? (Circle all that apply)

a Not Easily Available/Accessible
b Not Relevant For What I Do
c Don't Use Technical Reports
d Can Get The Same Information More Easily From Another Source
e Rely On Others (e.g., Librarian) To Search For Relevant/Needed Information
f Difficult To Obtain What's In There
g Other_____

**PLEASE GO TO Q19 ON PAGE 4**

18. To what extent has each of the following factors influenced your use of **CAB**? For each factor (e.g., accessibility), please indicate by circling from 1 to 5 how much this reason influenced your decision.

| | GREATLY INFLUENCED | | | | NOT INFLUENCED |
|---|---|---|---|---|---|
| a ACCESSIBILITY: the ease of getting to the information source . . . . . | 1 | 2 | 3 | 4 | 5 |
| b EASE OF USE: the ease of comprehending or utilizing the information . . . . . | 1 | 2 | 3 | 4 | 5 |
| c EXPENSE: low cost in comparison to other information sources . . . . . | 1 | 2 | 3 | 4 | 5 |
| d FAMILIARITY OR EXPERIENCE: prior knowledge or previous use of the information source . . . . . | 1 | 2 | 3 | 4 | 5 |
| e TECHNICAL QUALITY OR RELIABILITY: the information was expected to be the best in terms of quality, accuracy, and reliability . . . . . | 1 | 2 | 3 | 4 | 5 |
| f COMPREHENSIVENESS: the expectation that the information source would provide broad coverage of the available knowledge | 1 | 2 | 3 | 4 | 5 |
| g RELEVANCE: the expectation that a high percentage of the information retrieved from the source would be used . . . | 1 | 2 | 3 | 4 | 5 |

19. Do you use **GRA&I**, the journal that announces technical reports from NTIS? (Circle number)

1 NO → PLEASE GO TO Q20 ON PAGE 4
2 YES, Frequently
3 YES, Sometimes
4 YES, Seldom

22. In terms of performing your present professional duties, how important is **GRA&I**? (Circle number)

1 VERY IMPORTANT
2 SOMEWHAT IMPORTANT
3 OF LITTLE IMPORTANCE

23. In the past six months, what percentage of your use of **GRA&I** was for educational purposes (e.g., teaching, professional development); research (basic and/or applied); and for the management (e.g., planning, budgeting) of research?

_____% EDUCATIONAL
_____% RESEARCH
_____% MANAGEMENT
_____% OTHER
100 % TOTAL

20. Are you familiar with **GRA&I**? (Circle number)

1 NO → **PLEASE GO TO Q25 ON PAGE 5**
2 YES

21. Why don't you use **GRA&I**? (Circle all that apply)

a Not Easily Available/Accessible
b Not Relevant For What I Do
c Don't Use Technical Reports
d Can Get The Same Information More Easily From Another Source
e Rely On Others (e.g., Librarian) To Search For Relevant/Needed Information
f Difficult To Obtain What's In There
g Other_____

**PLEASE GO TO Q25 ON PAGE 5**

24. To what extent has each of the following factors influenced your use of **GRA&I**? For each factor (e.g., accessibility), please indicate by circling from 1 to 5 how much this reason influenced your decision.

| | GREATLY INFLUENCED | | | | NOT INFLUENCED |
|---|---|---|---|---|---|
| a ACCESSIBILITY: the ease of getting to the information source . . . . . | 1 | 2 | 3 | 4 | 5 |
| b EASE OF USE: the ease of comprehending or utilizing the information . . . . . | 1 | 2 | 3 | 4 | 5 |
| c EXPENSE: low cost in comparison to other information sources . . . . . | 1 | 2 | 3 | 4 | 5 |
| d FAMILIARITY OR EXPERIENCE: prior knowledge or previous use of the information source . . . . . | 1 | 2 | 3 | 4 | 5 |
| e TECHNICAL QUALITY OR RELIABILITY: the information was expected to be the best in terms of quality, accuracy, and reliability . . . . . | 1 | 2 | 3 | 4 | 5 |
| f COMPREHENSIVENESS: the expectation that the information source would provide broad coverage of the available knowledge | 1 | 2 | 3 | 4 | 5 |
| g RELEVANCE: the expectation that a high percentage of the information retrieved from the source would be used . . . | 1 | 2 | 3 | 4 | 5 |

**These data will help determine the use of electronic, online bibliographic databases by aerospace engineers and scientists.**

25. Do you use **RECON**, the NASA computerized, online interactive system that provides access to technical reports, journal articles, and other documents? (Circle number)

1 NO → (go to Q26)
2 YES, Frequently
3 YES, Sometimes
4 YES, Seldom

27. Do you: (Circle number)

1 Do **all** searches yourself
2 Do **most** searches yourself
3 Do **half** by yourself and **half** through an intermediary
4 Do **most** searches through an intermediary
5 Do **all** searches through an intermediary

29. In the past six months, what percentage of your use of **RECON** was for educational purposes (e.g., teaching, professional development); research (basic and/or applied); and for the management (e.g., planning, budgeting) of research?

_____% EDUCATIONAL
_____% RESEARCH
_____% MANAGEMENT
_____% OTHER
100 % TOTAL

26. Are you familiar with **RECON**? (Circle number)

1 NO → **PLEASE GO TO Q31 ON PAGE 6**
2 YES

28. Why don't you use **RECON**? (Circle all that apply)

a Not Easily Available/Accessible
b Not Relevant For What I Do
c Skill In Using Computer Hardware/Software
d Skill In Using A Database
e Not Timely/Current
f Can Get The Same Information More Easily From Another Source
g Difficult To Obtain What's In There
h The System Is Not 'User Friendly'
i Other_____

**PLEASE GO TO Q31 ON PAGE 6**

30. To what extent has each of the following factors influenced your use of **RECON**? For each factor (e.g., accessibility), please indicate by circling from 1 to 5 how much this reason influenced your decision.

| | GREATLY INFLUENCED | | | | NOT INFLUENCED |
|---|---|---|---|---|---|
| a ACCESSIBILITY: the ease of getting to the information source . . . . . | 1 | 2 | 3 | 4 | 5 |
| b EASE OF USE: the ease of comprehending or utilizing the information . . . . . | 1 | 2 | 3 | 4 | 5 |
| c EXPENSE: low cost in comparison to other information sources . . . . . | 1 | 2 | 3 | 4 | 5 |
| d FAMILIARITY OR EXPERIENCE: prior knowledge or previous use of the information source . . . . . | 1 | 2 | 3 | 4 | 5 |
| e TECHNICAL QUALITY OR RELIABILITY: the information was expected to be the best in terms of quality, accuracy, and reliability . . . . . | 1 | 2 | 3 | 4 | 5 |
| f COMPREHENSIVENESS: the expectation that the information source would provide broad coverage of the available knowledge | 1 | 2 | 3 | 4 | 5 |
| g RELEVANCE: the expectation that a high percentage of the information retrieved from the source would be used . . . | 1 | 2 | 3 | 4 | 5 |

31. Do you use **DROLS**, the DOD computerized, online interactive system that provides access to technical reports, journal articles, and other documents? (Circle number)

1 NO →
2 YES, Frequently
3 YES, Sometimes
4 YES, Seldom

32. Are you familiar with **DROLS**? (Circle number)

1 NO → **PLEASE GO TO Q37 ON PAGE 7**
2 YES

34. Why don't you use **DROLS**? (Circle all that apply)

a Not Easily Available/Accessible
b Not Relevant For What I Do
c Skill In Using Computer Hardware/Software
d Skill In Using A Database
e Not Timely/Current
f Can Get The Same Information More Easily From Another Source
g Difficult To Obtain What's In There
h The System Is Not 'User Friendly'
i Other_____

**PLEASE GO TO Q37 ON PAGE 7**

33. Do you: (Circle number)

1 Do **all** searches yourself
2 Do **most** searches yourself
3 Do **half** by yourself and **half** through an intermediary
4 Do **most** searches through an intermediary
5 Do **all** searches through an intermediary

35. In the past six months, what percentage of your use of **DROLS** was for educational purposes (e.g., teaching, professional development); research (basic and/or applied); and for the management (e.g., planning, budgeting) of research?

_____% EDUCATIONAL
_____% RESEARCH
_____% MANAGEMENT
_____% OTHER
100 % TOTAL

36. To what extent has each of the following factors influenced your use of **DROLS**? For each factor (e.g., accessibility), please indicate by circling from 1 to 5 how much this reason influenced your decision.

| | GREATLY INFLUENCED | | | | NOT INFLUENCED |
|---|---|---|---|---|---|
| a ACCESSIBILITY: the ease of getting to the information source . . . . . | 1 | 2 | 3 | 4 | 5 |
| b EASE OF USE: the ease of comprehending or utilizing the information . . . . . | 1 | 2 | 3 | 4 | 5 |
| c EXPENSE: low cost in comparison to other information sources . . . . . | 1 | 2 | 3 | 4 | 5 |
| d FAMILIARITY OR EXPERIENCE: prior knowledge or previous use of the information source . . . . . | 1 | 2 | 3 | 4 | 5 |
| e TECHNICAL QUALITY OR RELIABILITY: the information was expected to be the best in terms of quality, accuracy, and reliability . . . . . | 1 | 2 | 3 | 4 | 5 |
| f COMPREHENSIVENESS: the expectation that the information source would provide broad coverage of the available knowledge | 1 | 2 | 3 | 4 | 5 |
| g RELEVANCE: the expectation that a high percentage of the information retrieved from the source would be used . . . | 1 | 2 | 3 | 4 | 5 |

37. Do you use the **NTIS File**, a computerized, commercially available database that provides access to those government technical reports available from NTIS? (Circle number)

1 NO → **PLEASE GO TO Q43 ON PAGE 8**
2 YES, Frequently
3 YES, Sometimes
4 YES, Seldom

39. Do you: (Circle number)

1 Do **all** searches yourself
2 Do **most** searches yourself
3 Do **half** by yourself and **half** through an intermediary
4 Do **most** searches through an intermediary
5 Do **all** searches through an intermediary

41. In the past six months, what percentage of your use of the **NTIS File** was for educational purposes (e.g., teaching, professional development); research (basic and/or applied); and for the management (e.g., planning, budgeting) of research?

_____% EDUCATIONAL
_____% RESEARCH
_____% MANAGEMENT
_____% OTHER
100 % TOTAL

38. Are you familiar with the **NTIS File**? (Circle number)

1 NO → **PLEASE GO TO Q43 ON PAGE 8**
2 YES

40. Why don't you use the **NTIS File**? (Circle all that apply)

a Not Easily Available/Accessible
b Not Relevant For What I Do
c Skill In Using Computer Hardware/Software
d Skill In Using A Database
e Not Timely/Current
f Can Get The Same Information More Easily From Another Source
g Difficult To Obtain What's In There
h The System Is Not 'User Friendly'
i Other_____

**PLEASE GO TO Q43 ON PAGE 8**

42. To what extent has each of the following factors influenced your use of the **NTIS File**? For each factor (e.g., accessibility), please indicate by circling from 1 to 5 how much this reason influenced your decision.

| | GREATLY INFLUENCED | | | | NOT INFLUENCED |
|---|---|---|---|---|---|
| a ACCESSIBILITY: the ease of getting to the information source . . . . . | 1 | 2 | 3 | 4 | 5 |
| b EASE OF USE: the ease of comprehending or utilizing the information . . . . . | 1 | 2 | 3 | 4 | 5 |
| c EXPENSE: low cost in comparison to other information sources . . . . . | 1 | 2 | 3 | 4 | 5 |
| d FAMILIARITY OR EXPERIENCE: prior knowledge or previous use of the information source . . . . . | 1 | 2 | 3 | 4 | 5 |
| e TECHNICAL QUALITY OR RELIABILITY: the information was expected to be the best in terms of quality, accuracy, and reliability . . . . . | 1 | 2 | 3 | 4 | 5 |
| f COMPREHENSIVENESS: the expectation that the information source would provide broad coverage of the available knowledge | 1 | 2 | 3 | 4 | 5 |
| g RELEVANCE: the expectation that a high percentage of the information retrieved from the source would be used . . . | 1 | 2 | 3 | 4 | 5 |

**These data will help determine the information-seeking and use habits of aerospace engineers and scientists.**

43. In the past year, have you used the results of **federally-funded aerospace R&D**? (Circle number)

    1 NO →
    2 YES, Frequently
    3 YES, Sometimes
    4 YES, Seldom

44. Why didn't you use the results of **federally-funded aerospace R&D**? (Circle all that apply)

    a Not Easily Available/Accessible
    b Not Relevant For What I Do
    c Not Timely/Current
    d Difficult To Obtain
    e Other_____

    **PLEASE GO TO Q47 BELOW**

45. In terms of performing your present professional duties, how important are the results of **federally-funded aerospace R&D**? (Circle number)

    1 VERY IMPORTANT
    2 SOMEWHAT IMPORTANT
    3 OF LITTLE IMPORTANCE

46. What problems do you most encounter when seeking the results of **federally-funded aerospace R&D**? (Circle all that apply)

    a Time required to find the information
    b Physical access: time required to obtain the information
    c Physical quality of the published information
    d Intellectual quality of the published information
    e Limitations/restrictions/access to the information
    f None
    g Other_____

47. Do you use **foreign language technical reports**? (Circle number)

    1 NO →
    2 YES, Frequently
    3 YES, Sometimes
    4 YES, Seldom

48. Why don't you use **foreign language technical reports**? (Circle all that apply)

    a Not Easily Available/Accessible
    b Not Relevant For What I Do
    c Don't Read The Language
    d Don't Use Technical Reports
    e Physical Access, Time Required To Obtain A Translation
    f Red Tape Involved In Obtaining A Foreign Language Technical Report
    g Not Reliable/Language Translation Inaccurate
    h Intellectual Quality Of The Research
    i Other_____

    **PLEASE GO TO Q50 ON PAGE 9**

49. In terms of performing your present professional duties, how important are **foreign language technical reports**? (Circle number)

    1 VERY IMPORTANT
    2 SOMEWHAT IMPORTANT
    3 OF LITTLE IMPORTANCE

**Finally, we would like to collect some background information that will be helpful with the analysis of the data.**

50. Which is the highest level of education that you have completed? (Circle one number)

1 NO DEGREE
2 TECHNICAL OR VOCATIONAL DEGREE
3 BACHELOR'S DEGREE
4 MASTER'S DEGREE
5 MBA
6 JD
7 DOCTORATE
8 POST DOCTORATE_____
9 OTHER_____

51. Are you trained as: (Circle one number)

Educational Preparation
1 ENGINEER
2 SCIENTIST
3 OTHER_____

52. Would your present professional duties be classified as: (Circle one number)

Present Professional Duties
1 ENGINEER
2 SCIENTIST
3 OTHER_____

53. How many years of professional work experience in aerospace do you have?

_____YEARS in aerospace

54. Which of the following best describes the type of organization where you work? (Circle ONLY one number)

1 ACADEMIC
2 GOVERNMENT (DOD)
3 GOVERNMENT (NASA)
4 GOVERNMENT (OTHER)
5 INDUSTRIAL
6 NON-PROFIT
7 RETIRED OR NOT EMPLOYED
8 OTHER_____

55. What is your PRIMARY professional duty? (Circle ONLY one number)

1 ACADEMIC/TEACHING (may include research)
2 RESEARCH
3 ADMINISTRATIVE/ MANAGEMENT (profit sector)
4 TECHNICAL ADMINISTRATIVE/ MANAGEMENT (profit sector)
5 ADMINISTRATIVE/MANAGEMENT (Government, non-profit)
6 TECHNICAL ADMINISTRATIVE/ MANAGEMENT (Government, non-profit)
7 DESIGN/DEVELOPMENT RDT&E
8 MANUFACTURING/PRODUCTION
9 MARKETING/SALES
10 SERVICE/MAINTENANCE
11 PRIVATE CONSULTANT
12 OTHER_____

56. What is your PRINCIPAL AIAA interest group? (Circle ONLY one number)

1 AEROSPACE SCIENCES
2 AIRCRAFT SYSTEMS
3 INFORMATION & LOGISTIC SYSTEMS
4 PROPULSION & ENERGY
5 SPACE & MISSILE SYSTEMS
6 STRUCTURES, DESIGN & TEST
7 OTHER_____

57. Which of the following BEST characterizes your area of work or characterizes the application of your work? (Circle ONLY one number)

1 AERONAUTICS
2 ASTRONAUTICS
3 ENGINEERING
4 GEOSCIENCES
5 LIFE SCIENCES
6 MATHEMATICAL & COMPUTER SCIENCES
7 MATERIALS & CHEMISTRY
8 PHYSICS
9 SPACE SCIENCES
10 OTHER_____

58. Is any of your current work funded by the Federal government? (Circle answer)

YES NO

59. Who supplies the largest proportion of funds for your current research/project(s)? (Circle number)

1 FEDERAL GOVERNMENT
2 PRIVATE INDUSTRY
3 EDUCATIONAL INSTITUTION
4 NON-PROFIT INSTITUTION
5 OTHER _____

## OPTIONAL QUESTIONS

1. What, in **YOUR** opinion, is the greatest problem(s) in finding out about and obtaining the results of federally-funded aerospace R&D?

_____
_____
_____
_____

2. What suggestions can **YOU** offer for improving access to the results of federally-funded aerospace R&D?

_____
_____
_____
_____

3. Is there anything else **YOU** would care to say regarding this research?

_____
_____
_____
_____

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**12a. DISTRIBUTION/AVAILABILITY STATEMENT**
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**13. ABSTRACT** *(Maximum 200 words)*

The U.S. government technical report is a primary means by which the results of federally funded research and development (R&D) are transferred to the U.S. aerospace industry. However, little is known about this information product in terms of its actual use, importance, and value in the transfer of federally funded R&D. To help establish a body of knowledge, the U.S. government technical report is being investigated as part of the *NASA/DoD Aerospace Knowledge Diffusion Research Project.* In this report, we summarize the literature on technical reports and provide a model that depicts the transfer of federally funded aerospace R&D via the U.S. government technical report. We present results from two surveys of our investigation of aerospace knowledge diffusion vis-á-vis the U.S. government technical report and close with a brief overview of on-going research into aerospace knowledge diffusion focusing on the role of the industry-affiliated information intermediary.

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